

Machine and Tool  
**BLUE  
BOOK**

MARCH 1955



THE  
WASHINGTON AWARD

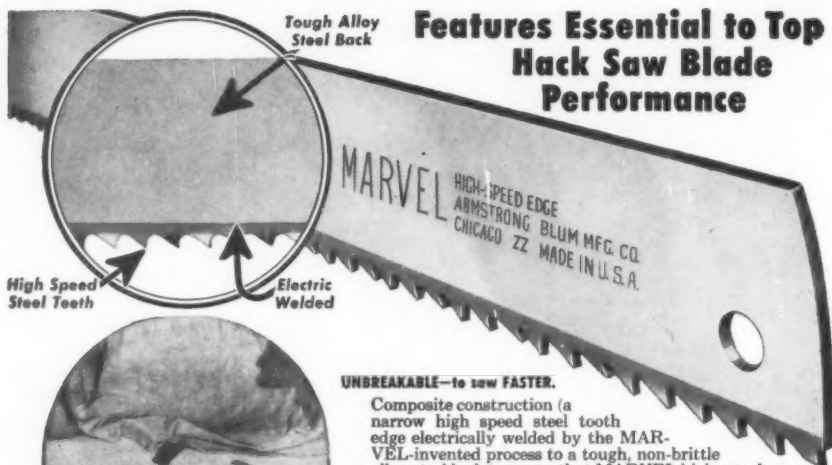


Dr. Lillian M. Gilbreth

"Handicapped are people  
with more things."

A HITCHCOCK  
PUBLICATION

CONTENTS ON PAGES 5 and 6



## Features Essential to Top Hack Saw Blade Performance

High Speed  
Steel Teeth

Tough Alloy  
Steel Back

Electric  
Welded

### UNBREAKABLE—to saw FASTER.

Composite construction (a narrow high speed steel tooth edge electrically welded by the MARVEL-invented process to a tough, non-brittle alloy steel body), means that MARVEL high-speed-edge can be subjected to the MAXIMUM feed pressure that any hack sawing machine is capable of applying. MARVEL blades need not be "babied" for fear of breakage!

### SHATTERPROOF—for SAFETY.

MARVEL blades never shatter or "explode" as do the ordinary "brittle" blades shown at left which so often cause personal-injury accidents such as the loss of an eye or severe laceration and expensive damage to the sawing machine. Operators who use MARVEL blades exclusively soon "get the habit" to apply heavier feeds, greater blade tension, higher speeds—to do their work faster, because they know they are SAFE with MARVEL.

### SHARPER, PREMIUM-STEEL TEETH—to wear LONGER.

Teeth are accurately machined by a MARVEL-invented process that assures sharper tooth points and positive uniformity of tooth shape and degree of set from end-to-end of every MARVEL blade. The steel used in the tooth edge is carefully selected from the finest high speed steels available throughout the world, regardless of cost or source—truly premium steels, without premium cost.

### QUALITY CONTROL—to assure UNIFORMITY.

With more than a quarter century of experience in inventing, perfecting, and producing welded-edge hack saw blades, MARVEL has provided its own laboratory with the most modern metallurgical instruments and techniques known to the applicable sciences for the specific purpose of maintaining highest possible quality control. Coupled with rigid tests and meticulous inspection of every MARVEL blade, uniform quality is assured.

These are only a few features that make MARVEL High-Speed-Edge Blades such outstanding performers.

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and Finishes  
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## Honed Lands Prevent Fluid Leakage, Assure Sensitive Hydraulic Control

*Sunnen Honing Produces Exact Alignment...  
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Avoids Port Washout*

**PROBLEM:** The holes in this Meehanite valve sleeve at Village Gage Company have tolerances of .0005" on the 1.125" diameter (a blind hole), and .0002" on the .6255" diameter. Surface finish must be 2-6 micro-inches RMS. Lands must be perfectly aligned. These specifications assure sensitive, positive response to hydraulic control settings, without pressure drop or leakage.

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as it is on this valve sleeve. Sunnen Honing Machines handle parts of all shapes and sizes, usually without jigs or fixtures. Accuracy is guaranteed to within .0001". Surface finish can be held as low as 2 micro-inches RMS in hardened steel. Diameter range is  $\frac{1}{8}$ " to  $2\frac{5}{8}$ ".

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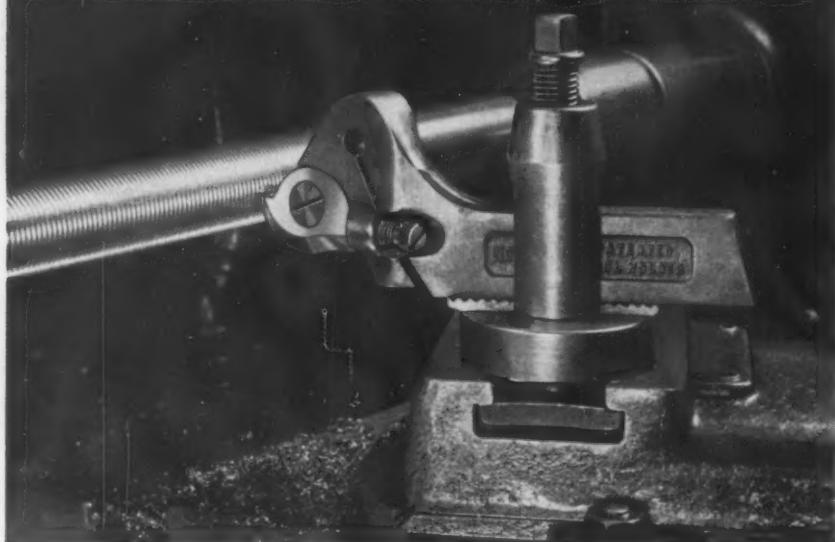
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Hitchcock District Managers are Listed on Page 64.

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## HEAVY LOAD / LIGHT WORK

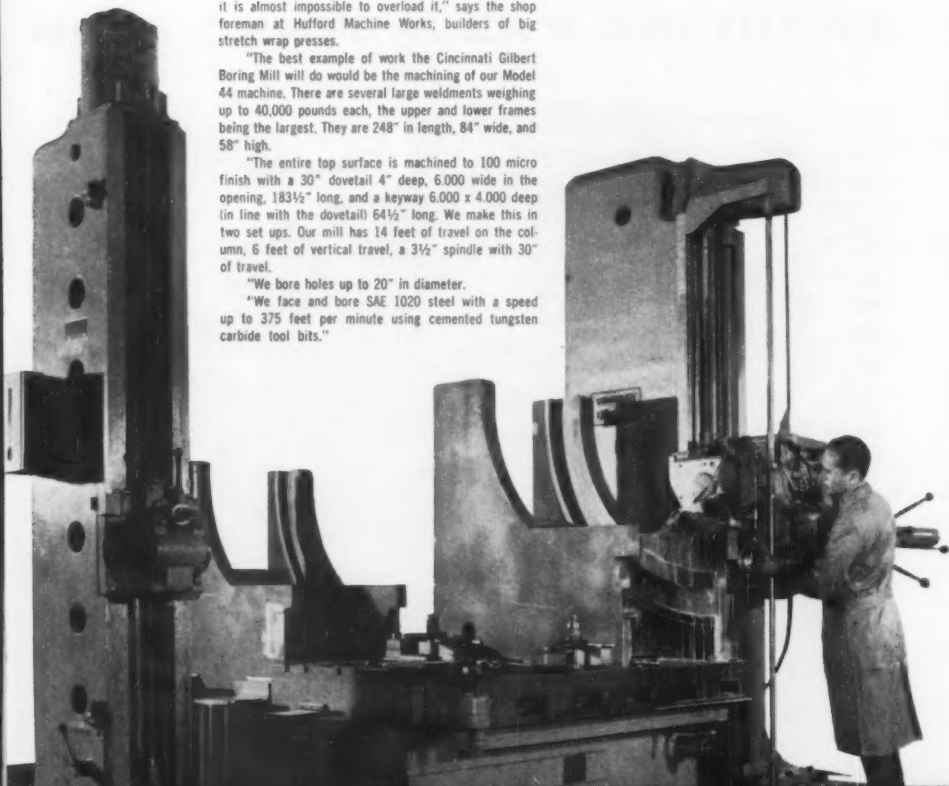
"The thing I like about the Cincinnati Gilbert is that it is almost impossible to overload it," says the shop foreman at Hufford Machine Works, builders of big stretch wrap presses.

"The best example of work the Cincinnati Gilbert Boring Mill will do would be the machining of our Model 44 machine. There are several large weldments weighing up to 40,000 pounds each, the upper and lower frames being the largest. They are 248" in length, 84" wide, and 58" high.

"The entire top surface is machined to 100 micro finish with a 30° dovetail 4" deep, 6,000 wide in the opening, 183½" long, and a keyway 6,000 x 4,000 deep (in line with the dovetail) 64½" long. We make this in two set ups. Our mill has 14 feet of travel on the column, 6 feet of vertical travel, a 3½" spindle with 30" of travel.

"We bore holes up to 20" in diameter.

"We face and bore SAE 1020 steel with a speed up to 375 feet per minute using cemented tungsten carbide tool bits."



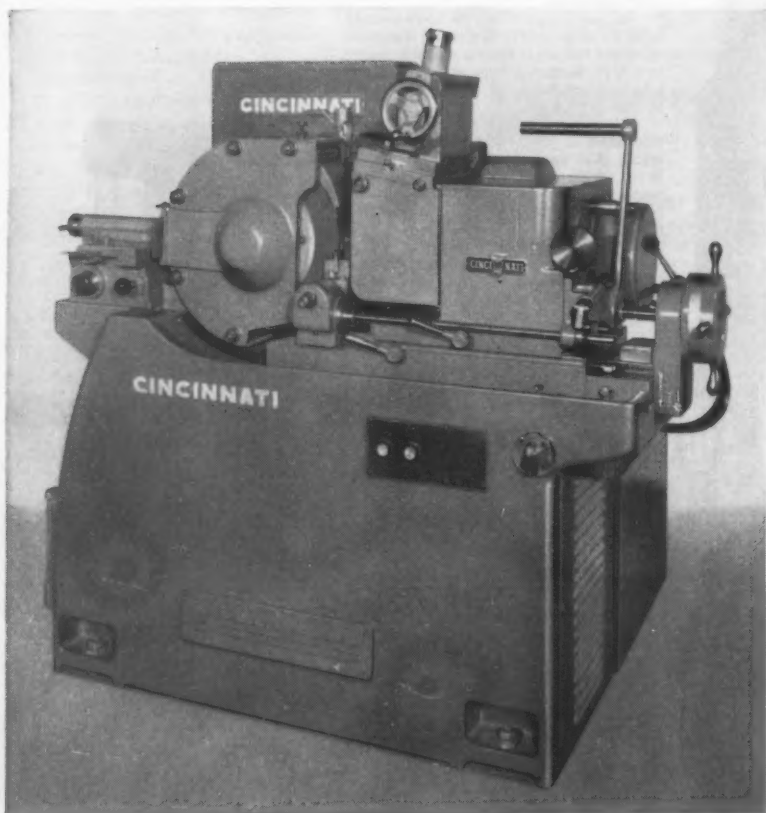
Centralized controls, frictionless response, maximum flow of power from motor to tool make light work of heavy loads on a Gilbert. Hufford uses a floor type machine with sliding table. Many other arrangements are available. Write for literature on these versatile machines.

# GILBERT

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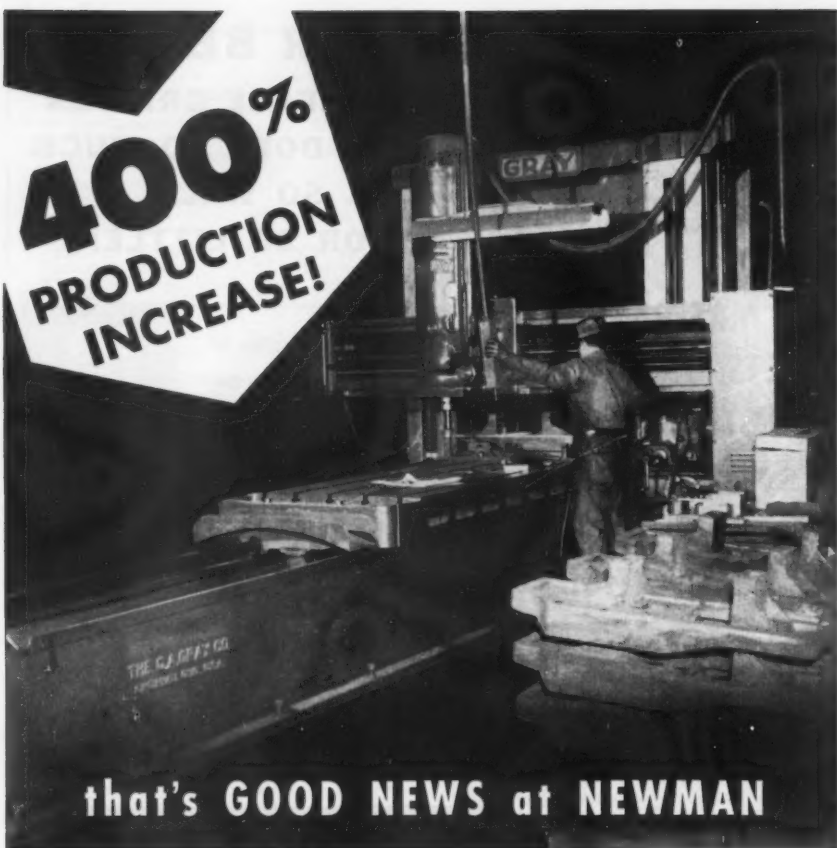
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Recently completed Maserati Plant and service-supply office, Westbury, N. Y.

## **MASERATI SETS UP U. S. DISTRIBUTION ENGINEERING- SERVICE ORGANIZATION**

Famous internationally for its precision-built racing and sports cars, the newly formed Maserati Corporation of America now has a new plant in Westbury, N.Y. from which to supply parts and engineering service on the lines of well-known machine tools produced by its affiliated companies.

In addition to the new BLOHM surface grinders, the company is supplying horizontal and vertical milling machines (sizes 0, 1, 2, 3, 4.); radial drills; hydraulic tracing attachments for lathes; milling machines and shapers; engine lathes and vertical boring machines; tool room lathes; and iron workers.

The affiliated companies are Robert Blohm; Caser, Ficep, Induma, Flli Morando, Tovaglieri and Duplomatic.

The distribution set up is now underway, with a number of distributorships still available.

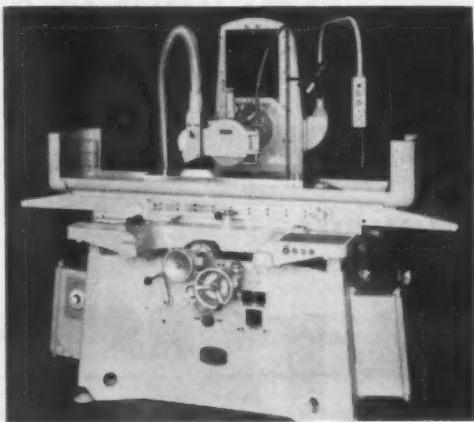
## **NEVER BEFORE! A SURFACE GRINDER THAT DOES SO MUCH . . . SO WELL . . . FOR SO LITTLE!**

The Maserati Corporation of America Stands Squarely Behind These Claims For its NEW BLOHM Precision Surface Grinders.



Serge A. Toumaniantz, President Maserati Corporation of America.

Yes, I can demonstrate conclusively that the new, improved BLOHM horizontal surface grinder will help you do a better over-all job at a lower initial investment and reduced maintenance for these reasons:



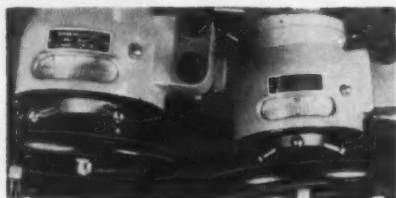
TECHNICAL DATA	HFS-4	HFS-6	HFS-9	HFS-510	HFS-12
Table Clamping Surface	20"x12"	28x12	40x12	44x19-11/16	52x12
Maximum Length Ground	16"	23-5/8"	35-7/16"	39-3/8"	47-1/4"
Maximum Width Ground	12"	15-3/4"	15-3/4"	19-11/16"	15 3/4"
Maximum distance from table to spindle centre line	23 1/2"	23-5/8"	23-5/8"	22-5/8"	23-5/8"
Grinding Wheel diameter—					
Standard inches	9-27/32	9-27/32	11-13/16	9-27/32	11-13/16
Maximum inches	15-3/4	15-3/4	15-3/4	15-3/4	15-3/4
Minimum inches	6	6	6	6	6

**1. THE TABLE:** The design principle used in the new BLOHM surface grinder assures maximum precision and accuracy on every job. The cross movement is performed by the table instead of the head which moves vertically only. For added precision plus operating smoothness and long life, the saddle and table are carried on ball bearing assemblies operating on hardened, precision ground chromium-nickel-steel ways.

**2. THE SPINDLE:** Here the unique feature is the powerful 5 h. p. motor mounted directly on the spindle which works on adjustable tapered bronze bushings with pressure lubrication. Wheels up to 4" in width can be used in conjunction with a cross feed up to 2 1/2" per stroke. These table and spindle features combined with unusually sturdy over all construction practically eliminates vibration and helps insure maximum concentricity.

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**4. COMPLETELY AUTOMATIC CYCLE:** The exclusive BLOHM FINIMATIC device (optional) permits you to set the job and let the machine carry out the complete grinding cycle. The machine stops itself after three idle runs to allow it to cool off.



Exclusive BLOHM MICROTIP controls give push-button feed adjustments up to .00004".



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Maserati Corporation of America  
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Company.....  
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City..... State.....

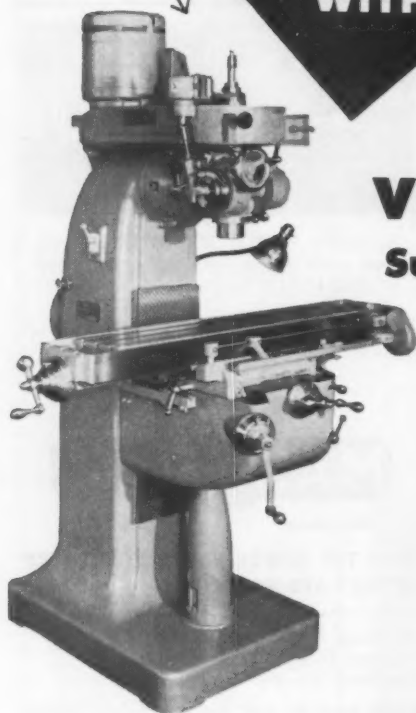
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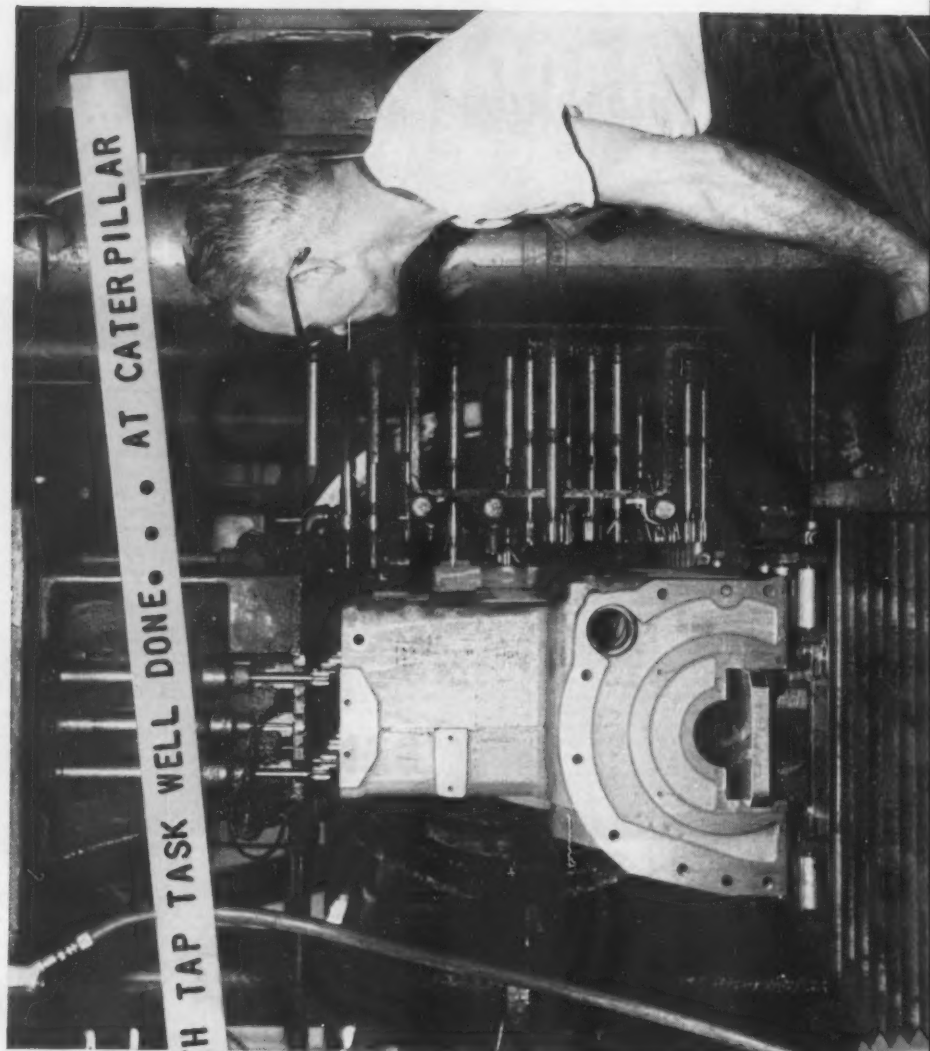
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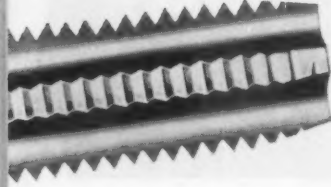
*...to finished die sets*

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7/8 9 NC  
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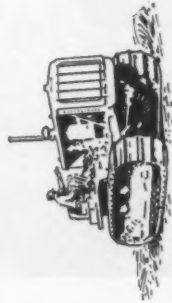


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*(Division of VAN NORMAN COMPANY)*

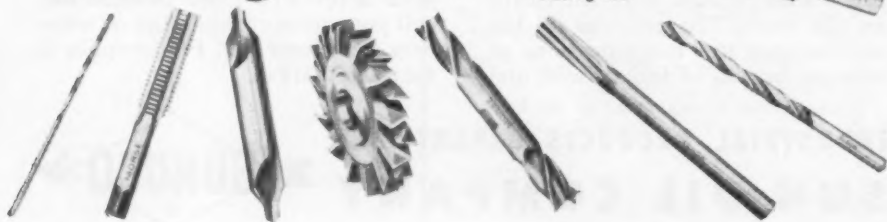
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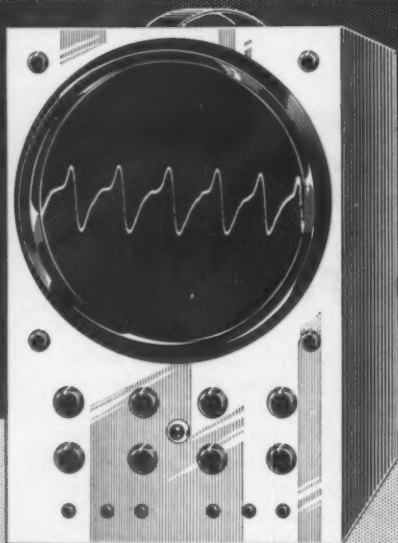


# **MORSE**

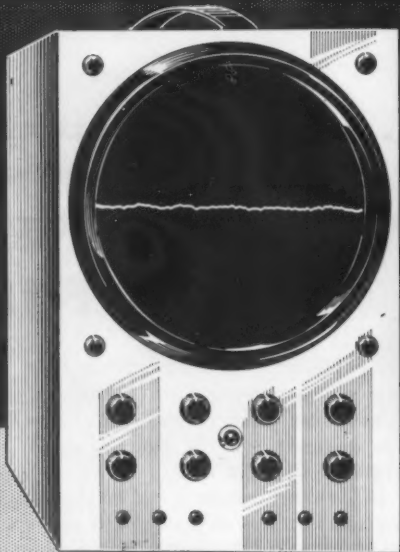
## **Cutting Tools**

Buy them by phone  
from your Morse-Franchised  
Distributor and save  
ordering time





**WHEN A STRAIGHT MINERAL OIL** was used to lubricate the ways, an 0.0008" jump at frequency of 2.74 cycles per second was noted.



**WHEN SUNOCO WAY LUBRICANT** was used on the ways, the jump was too small to measure, proof that this medium stops slip-stick motion.

## TEST PROVES SUNOCO WAY LUBRICANT ENDS SLIP-STICK TABLE MOTION

How effectively Sunoco Way Lubricant stops slip-stick table motion is graphically illustrated by these oscillograms. The pattern on the left was made with a straight mineral oil as the lubricant; the other was made with Sunoco Way Lubricant on the ways. The patterns on the oscilloscopes are magnifications of changes in rate of table travel and

were obtained under identical operating conditions.

You can stop slip-stick table motion, protect the ways, get better surface finishes, cut production losses with Sunoco Way Lubricant. Try it in your shop. For more information, call your nearest Sun office or write SUN OIL COMPANY, Philadelphia 3, Pa., Dept. MT-3.

**INDUSTRIAL PRODUCTS DEPARTMENT**  
**SUN OIL COMPANY**



PHILADELPHIA 3, PA. • SUN OIL COMPANY LTD., TORONTO & MONTREAL

Refiners of the famous Blue Sunoco Gasoline and Dynalube Motor Oils

# DURAFLEX ...

## a NEW fine-grain phosphor bronze with 30% GREATER ENDURANCE LIMIT

FINE-GRAIN STRUCTURE IS THE MAIN REASON ...



Micrographs (75x magnification) tell the inside story. Top, note the fine-grain structure of DURAFLEX. Compare it with the grain structure of ordinary phosphor bronze, bottom.

Try a FREE SAMPLE of

# DURAFLEX

Sheet ... up to 0.062" thick

Wire ... up to  $\frac{3}{16}$ " diameter (approx.)

DURAFLEX\* is a new, fine-grain phosphor bronze developed and sold only by Anaconda. Comparative fatigue tests show that the endurance limit of DURAFLEX is approximately 30% higher than for ordinary phosphor bronzes. In surface appearance, surface smoothness and resistance to corrosion, it is equal to, or better than, other phosphor bronzes. Further, its formability is increased with no sacrifice in yield strength. DURAFLEX is a *premium* phosphor bronze in every way except cost; there's *no increase in price*.

If you're now using a hard-temper phosphor bronze, chances are that you can do the same forming in extra-hard temper DURAFLEX. If you're looking for longer life in the parts you form, we'll be glad to send you a free sample of DURAFLEX. Try it, test it, and you will agree that it's superior.

5578-C

\*Trade-Mark

DURAFLEX fine-grain phosphor bronze

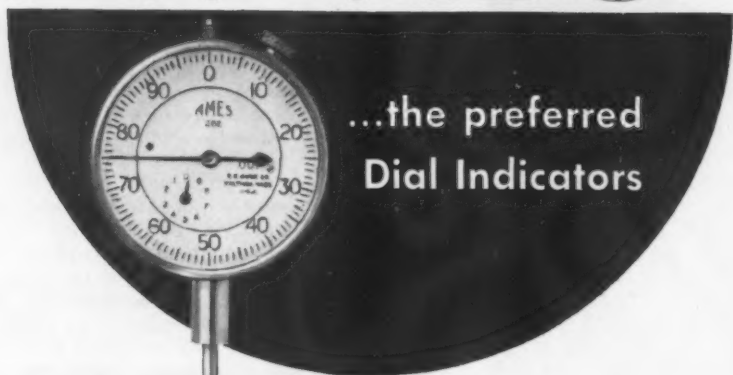
an **ANACONDA**® product  
MADE BY THE AMERICAN BRASS COMPANY

### FREE SAMPLE

The American Brass Company,  
Waterbury 20, Connecticut  
(In Canada: Anaconda American Brass, Ltd.,  
New Toronto, Ont.)  
Yes, we'd like to try DURAFLEX. Please send us  
a free sample of  
sheet in \_\_\_\_\_ temper, \_\_\_\_\_ thick,  
wire in \_\_\_\_\_ temper, \_\_\_\_\_ diameter.  
☐ We'd like to talk to one of your metallurgists about DURAFLEX.  
NAME .....  
COMPANY .....  
STREET .....  
CITY ..... ZONE ..... STATE .....



# AMES



**Over 16,000,000 cycles**  
**without wear or loss of accuracy . . .**  
**how many more will they complete?**

Several Ames Model 282 Long Range Dial Indicators *with plain bearings* are currently giving an amazing demonstration of performance and endurance under test conditions. After more than 16,000,000 cycles each, at 240 strokes per minute, 9 hours a day—they still have their original accuracy!

The reasons for this outstanding record? Simply high quality materials, simple basic design, rugged construction . . . and expert craftsmanship.

*If you would like to have our recommendations on your measurement problem, send blueprints and specifications. And ask for your free copy of our catalog on Ames micrometer dial indicators and gauges.*



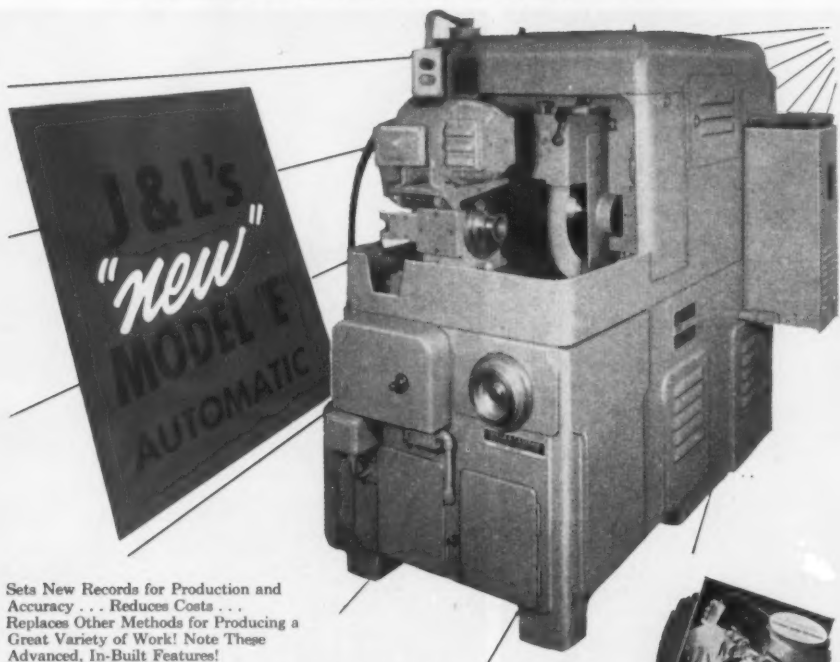
Representatives in  
 principal cities.

**B. C. AMES CO.**

28 Ames Street  
 Waltham 54, Mass.

Mfg. of Micrometer Dial Gauges • Micrometer Dial Indicators

# *An Outstanding Advance* in PLUNGE FORM GRINDING



Sets New Records for Production and Accuracy . . . Reduces Costs . . . Replaces Other Methods for Producing a Great Variety of Work! Note These Advanced, In-Built Features!

- **Completely automatic cycle** — High speed approach, wheel feed spark out and withdrawal are positively controlled through simple cam action — ensuring constant, uniform operation under all conditions.
- **Automatic positive size control** — The wheel slide is held against positive stops with uniform hydraulic pressure.
- **Automatic truing device** with controlled dressing.
- **Automatic or manual handling.**
- **Complete versatility** — chucking work, center work or shoe-type grinding; crush wheel or diamond truing.
- **Compact design** — affords exceptional accessibility and simple set-ups.



Write for illustrated folder — gives complete specifications and examples of how the Model "E" does jobs faster, better and more economically.

## JONES & LAMSON

JONES & LAMSON MACHINE CO., 520 Clinton St., Dept. 710, Springfield, Vt., U.S.A.



*Machine Tool Craftsmen  
Since 1835*

**MACHINE TOOL DIV.**

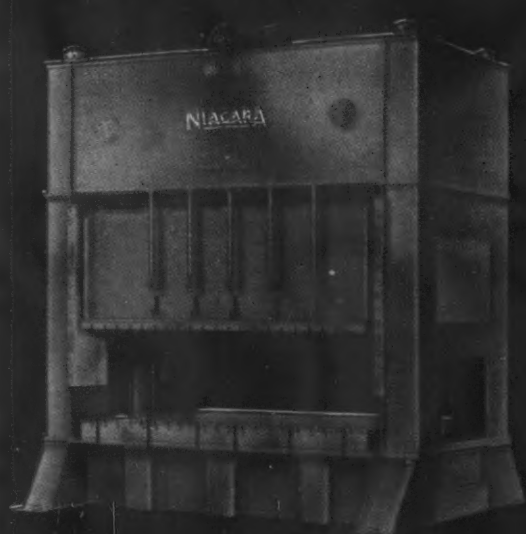
# NEW!

## MASTERFULLY ENGINEERED

excels in large, heavy tonnage



One-point suspension. 100 through 1000-ton capacities.



Four-point suspension. 200 through 1000-ton capacities.

### ► ECCENTRIC DRIVE DELIVERS GREATER TORQUE WITH LESS DEFLECTION

In Niagara Series SE Presses, the eccentric is an integral part of the main gear (or gears) which rotates on a stationary pin rigidly supported in the crown, close to the point at which the pressure is exerted. Serving merely as a pivot, the pin carries no torsional load and relatively little bending load. Net result: Niagara's eccentric gear design can deliver greater torque with less deflection than other types of construction.

### ► RUGGED, RIGID, ALL-STEEL FRAMES PROVIDE GREATER ACCURACY, LONGER DIE LIFE

Frames are rugged, all-steel, four-piece, tie rod construction of great strength and rigidity, stress relieved in a furnace and thoroughly grit-blasted before machining. Each frame size has been scientifically tested for deflection to meet Niagara standards—the most exacting in the industry.

### ► LOW INERTIA, PNEUMATIC FRICTION CLUTCH RUNS COOLER, WEARS LONGER

Most of the weight of the Niagara clutch continues to rotate with the flywheel. Only the drive shaft and driving plate start and stop with each cycle. The resulting low weight and inertia of the parts, picked up during clutch engagement, greatly reduce heat and wear. As the clutch rotates, it acts as a centrifugal blower, providing positive ventilation. Plates automatically compensate for normal wear, with no adjustment necessary.

### ► MODERN, STREAMLINED DESIGN EMPHASIZES COMPACTNESS

The entire driving assembly is neatly housed in the crown. There is no exposed, overhanging flywheel, clutch, brake, shaft nor motor in the rear of the press to obstruct crane service, block light, throw grease or consume space unnecessarily.

# LINE OF METALWORKING CHAMPIONS

drawing, punching and blanking work



Two-point suspension. 200 through 1000-ton capacities.

## DELUXE OPERATING CONTROLS INSURE UTMOST SAFETY, EFFICIENCY AND CONVENIENCE

Compactly and conveniently arranged on a master panel, Niagara controls are instantly accessible for fingertip direction of every press operation: starting, slide adjusting, jogging, die tryouts, running and stopping. The latest safety devices provide maximum protection for die setter, operator and the press itself. Nothing has been overlooked. Trial runs assure that all controls are in proper working order before each Niagara press leaves the plant.

Without equal in engineering design, performance and stamina, this great new line of Niagara Straight Side Eccentric Geared Presses is every inch a champion. It is an outstanding example of the advanced thinking that has made Niagara the pace-setter among builders of metal working machines for 75 years.

Masterfully engineered and ruggedly constructed to handle a tremendous variety of work, the new Niagara SE Series is the most practical and dependable press line built for:

- Work requiring large die areas.
- Heavy tonnage demands.
- Long stroke, deep drawing jobs where work is engaged high up on the stroke.
- Bottom-of-stroke blanking and punching.

### THE COMPLETE STORY IS READY FOR YOU NOW!

Make a feature-by-feature appraisal of what these great new presses can do for you. Write for newly published, illustrated Bulletin 66. It will be forwarded promptly without obligation.



NIAGARA MACHINE & TOOL WORKS • BUFFALO, 11, N.Y.  
DISTRICT OFFICES: BUFFALO • CLEVELAND  
DETROIT • NEW YORK • PHILADELPHIA

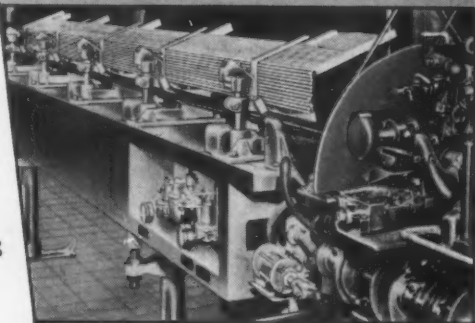
# NIAGARA

STRAIGHT SIDE  
ECCENTRIC GEARED  
PRESSES

America's Most Complete Line of Presses, Shears, Machines and Tools for Plate and Sheet Metal Work

# Now . . . A Screw-Machine-Feed that BREAKS THE TIME BARRIER!

Steps Up  
**PRODUCTION**  
to the  
Continuous Flow  
of the  
**FOURTH DIMENSION:**  
**TIME**



Every time a screw machine cuts air . . . every time feed fingers are adjusted or replaced . . . every time remnant removal forces a shut-down—*that's time lost forever, never again to be made up in the production quota!*

In the modern Lipe Automatic Magazine-Loading Bar Feed, we present a continuous-feed mechanism that utilizes **EVERY MINUTE** of the working day for production . . . and still more production.

There's **NO** cutting air. **NO** feed fingers. **NO** remnant problem. **NO** minimum or maximum run. **NO** limit on length of feed. **NO** selective stock length requirement.

**There IS a definite increase in production—up to 100% on some installations—AT LEAST 30% ON EVERY ONE!**



Bring your stopwatch to the ASTE Show, Booth No. 726, where you can clock a Lipe AML Bar Feed in action. If you can't make the Show, write for *free* booklet, "**TIME**—the Important 4th Dimension of Production and Profit."



## Lipe - ROLLWAY CORPORATION

Manufacturers of Automotive Clutches and Machine Tools  
Syracuse 1, N. Y.



**THE MOTCH & MERRYWEATHER CUTTING TOOL  
MANUFACTURING DIVISION**  
*offers you . . .*  
**cutting tool aids to production**

ASK YOUR DEALER  
ABOUT EVERY  
ONE OF THEM

SEGMENTAL TYPE • SOLID TYPE • SLITTING SAWS

• Get the full story on Motch & Merryweather's complete line of saw blades and slitting-slotting saws — a type, size, and thickness for every purpose. Triple-Chip cut-off blades up to 108" diameter down to slitting saws 3" in diameter — special

saws — for any machinable material, ferrous or non-ferrous, any size, any shape, any thickness. Ask how the M & M Triple-Chip Method reduces tooth strains, prolongs blade life and speeds production with accuracy.

**KROSLOK® FACE MILLING  
CUTTERS and  
SHELL END  
MILLS**



***Simplicity itself!***

Only 3 members — body, blade, wedge. Waffle design of body mates rigidly with waffle design in body. Cuts any machinable material. A profit-showing investment in precision production milling.

**TRIPLE C® GRINDING COOLANT**  
*Clear — Cool — Clean*

Triple C® grinding coolant makes for improved results and lower costs on all wet grinding. Transparent, stable solutions; maximum cooling; grinding wheels stay clean and free-cutting.

**TRIPLE-CHIP HEAVY DUTY  
ANTI-WELD SOLUBLE OIL**

M & M Heavy Duty Anti-Weld Soluble Oil lengthens tool life, especially under severe conditions. Deters "pickup", cuts rejects, is oily (not greasy), odorless; lowers production costs.

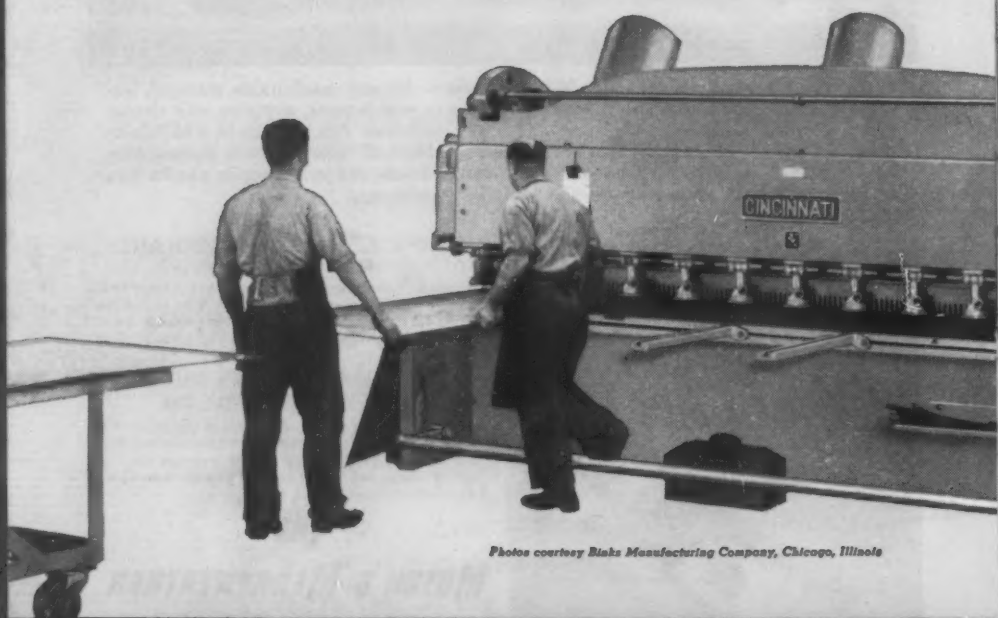
**THE  
MOTCH & MERRYWEATHER  
MACHINERY CO.**

*Cutting Tool Manufacturing Division*

1250 EAST 222nd STREET, CLEVELAND 17, OHIO



accurate **CINCINNATI**  
shearing from **20**  
**GAUGE**  
**SHEETS** to **5/16"**  
**PLATE** ...with **ONE**  
knife setting  
... **SPEEDS PRODUCTION**



*Photos courtesy Binks Manufacturing Company, Chicago, Illinois*



**THE CINCINNATI SHAPER CO.**

CINCINNATI 25, OHIO, U.S.A.

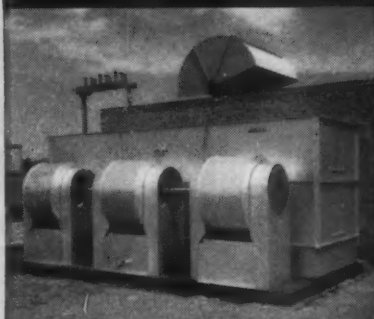
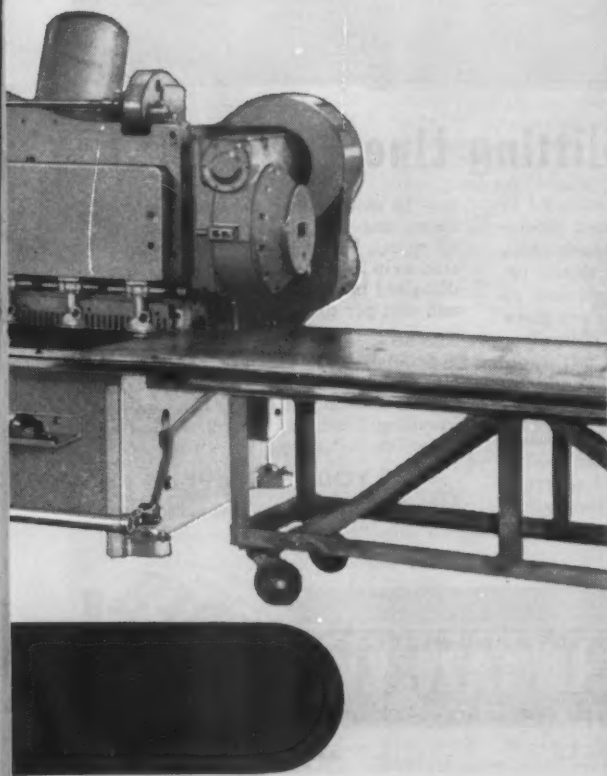
SHAPERS • SHEARS • BRAKES



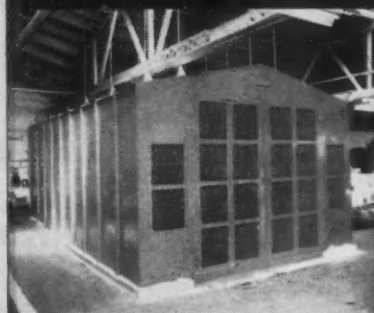
Here 20 gauge to  $\frac{1}{4}$ " plate is sheared with no change of knife clearance—a time saving and production increasing feature.

The Binks Manufacturing Company say this Cincinnati Shear is a very accurate machine and a most profitable investment.

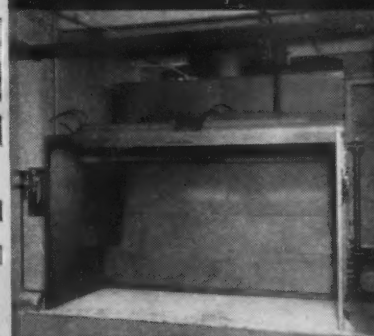
*Write for Catalog S-6.*



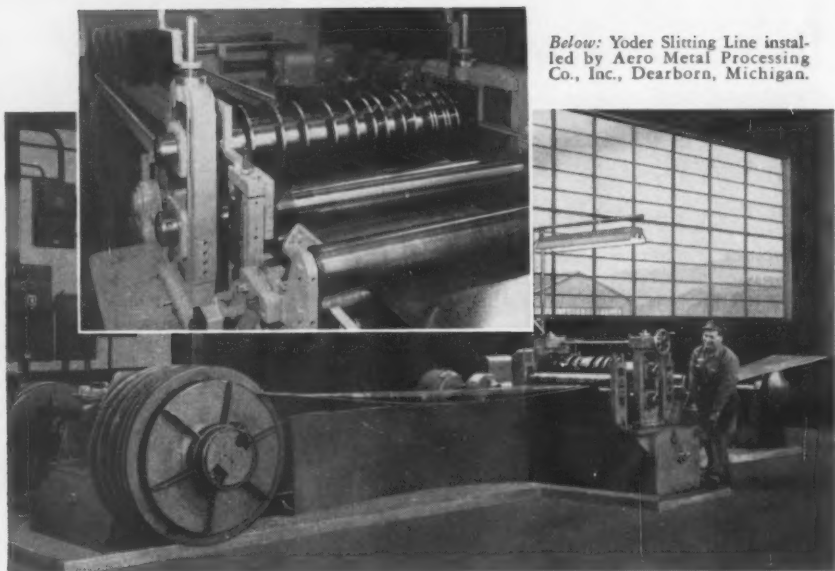
Water cooling tower



Dry auto spray booth



Water wash spray booth



Below: Yoder Slitting Line installed by Aero Metal Processing Co., Inc., Dearborn, Michigan.

## When is a Slitting Line Profitable?

Many variables are to be considered in determining where and when a slitting line becomes a good investment. Also of what size, type, speed it should be, and other special features required to make it most profitable under any given set of conditions. Without obligation, a Yoder representative will call upon request and discuss such details with you.

*The Yoder Slitter Book* deals extensively with basic considerations in the choice and operation of slitting lines; points out, for instance, how and where a relatively small, inexpensive installation

may be more economical than a larger, faster, and costlier one. (Yoder makes all types). Time studies show how coil size, strip gauge, slitter speed, coil handling and banding time affect cycle time and cost per ton.

The book is useful not only to present operators of slitting lines but to producers, users and distributors of strip and sheet metal who may be considering installing slitting equipment. A copy is yours for the asking.

### THE YODER COMPANY

5509 Walworth Ave. • Cleveland 2, Ohio

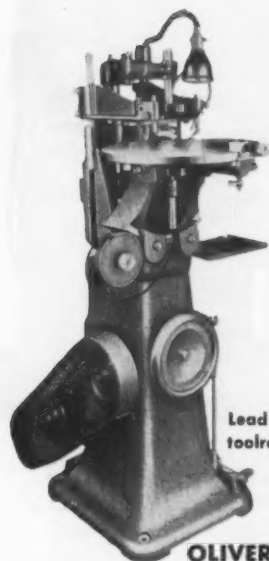
#### Complete Production Lines

- ★ COLD-ROLL-FORMING and auxiliary machinery
- ★ GANG SLITTING LINES for Coils and Sheets
- ★ PIPE and TUBE MILLS—cold forming and welding



# DON'T WASTE *Lead Time* — GET SMOOTHER TOOLROOM PRODUCTION

## with OLIVER DIE MAKING MACHINES



**OLIVER DIE MAKERS**  
Available in 5 Models

The Bench Model S-1 (illustrated) is a single speed die maker for use on tool steel up to 1" thick.

The Heavy Duty Model (illustrated) has 6 speeds, works in metal up to 3" thick, has variable strokes to 5" with hydraulic feed.

Write Today For Complete Technical Data on  
OLIVER DIE MAKERS

See our catalog in Sweet's Directory

### Leaders in Economy:

To maintain cost schedules, toolrooms must conserve lead time. OLIVER DIE MAKERS save you time . . . are easy to operate . . . do not require skilled labor. Because Olivers produce dies faster with more economical results, many plants have been constantly using them for more than 30 years.

### Leaders in Efficiency:

Proved every day in more than 10,000 installations around the world, OLIVER DIE MAKERS are consistently effecting cost reductions of as much as 60% by simplifying, sawing, filing and lapping operations.

### Leaders in Precision:

Tried and tested for four decades, OLIVER DIE MAKERS—engineered, designed and built by Oliver of Adrian—have proved themselves unsurpassed for accuracy on Dies, Production Filing, Experimental Work, Metal Patterns, Cams, Gages and Templates.

Lead time is saved along with lower die making costs . . . higher toolroom output . . . when you install an Oliver to saw, file and lap.



### MACHINE TOOLS by OLIVER include:

AUTOMATIC DRILL GRINDERS  
TOOL & CUTTER GRINDERS  
DRILL POINT THINNERS  
TEMPLATE TOOL GRINDERS  
FACE MILL GRINDERS  
DIE MAKING MACHINES

# OLIVER INSTRUMENT CO.

1408 E. MAUMEE

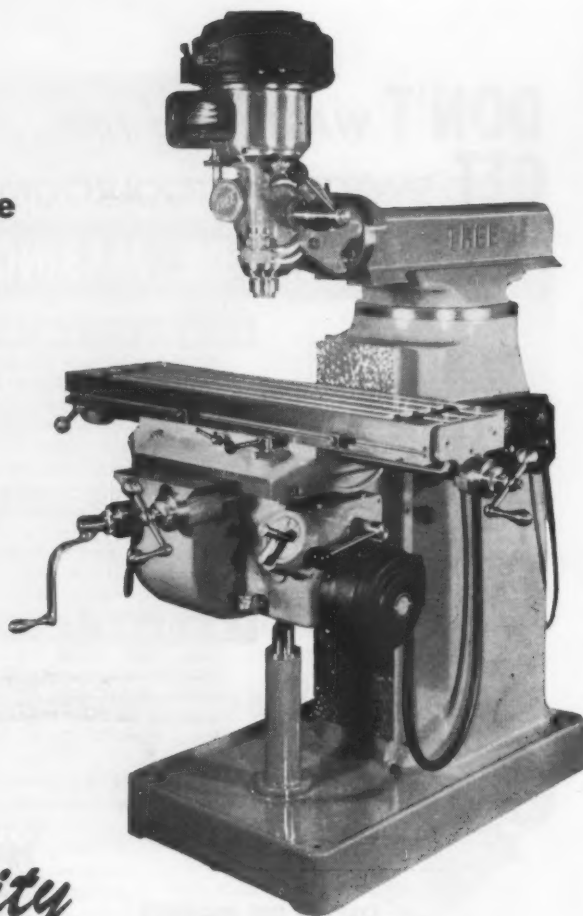
• ADRIAN, MICHIGAN

# The TREE 2UV MILL gives you these features—

- Roller Drive
- One Clamp Turret Lock
- Automatic Collet Closer
- Built-In Power Feed
- Rapid Traverse
- Labor Saving Operator Controls

*plus  
Versatility*

The TREE 2UV Vertical Mill combines rigidity and flexibility to make it one of the most versatile on the market today. The following features make it adaptable to a wide range of jobs:



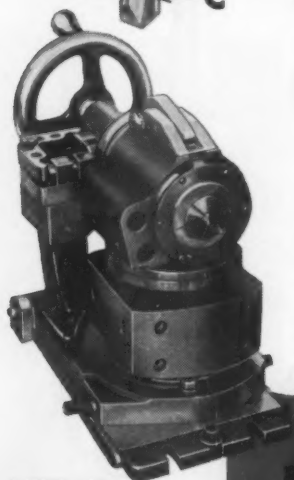
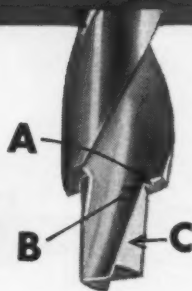
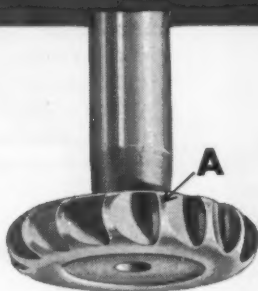
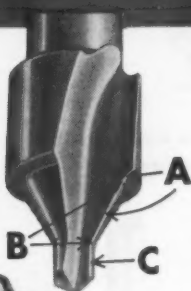
- Fully universal milling head with power feed
- Dovetail type ram—360° movable turret
- Table—10½" x 42"—power feed and rapid traverse
- Hardened and ground lead screws by Ex-Cell-O
- Ample range: 25" longitudinal, 11" transverse, 17½" vertical travel
- Weight—2400 lbs.

*Write for complete information . . .*

**TREE TOOL AND DIE WORKS**  
1600 JUNCTION AVENUE      RACINE, WISCONSIN

Manufacturers of—MH-4 UNIVERSAL MILLING HEADS  
TB-4 TAPER BORING TOOLS

**"RO" Form Relief** means longer life for cutting tools because it leaves supporting metal behind the cutting edge



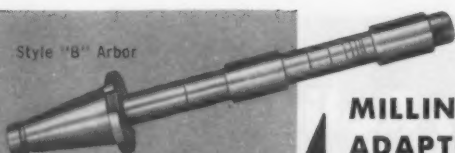
- A** Sharpens these cutting edges with any degree of form relief.
- B** No undercutting at intersection — no burr on work piece.
- C** Diameters can be cylindrically ground or relieved as desired.

There is a constant increase in the number of shops bringing their tool grinding practices up to date by standardizing on form relief sharpening as a means of reducing tool costs. No other fixture offers the ease of set-up and operation and the flexibility of the "RO" Universal Form Relieving Fixture.

WRITE FOR  
CATALOG

**GRINDER DIVISION**  
**ROYAL OAK TOOL & MACHINE CO.**  
29600 STEPHENSON HY.  
ROYAL OAK, MICH.

Style "B" Arbor



Style "C" Arbor



Cutter Adapter  
for End Mills



Adapter for  
Taper Shank Tools



## MILLING MACHINE ARBORS, ADAPTERS, ARBOR SPACERS AND BEARINGS

*Hardened and ground to high standards of accuracy and quality.*

These products are built by long established, reputable West German manufacturers, and tested for performance to American standards. Immediate delivery from New York City stock at low competitive prices.

Also available:

- Multi purpose vises
- Tapping attachments
- Lathe mandrels
- "Wille-Grip" keyless drill chucks
- Large variety of machine tools



## QUICK CHANGE CHUCKS & COLLETS

*All parts hardened and ground. Simplicity of construction insures trouble-free operation.*



Our headquarters in New York City

Write for complete details and prices to Dept. 303

**M.B.I. EXPORT & IMPORT LTD.**

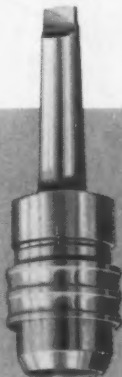
A Division of Machinery Builders Inc.

475 Grand Concourse, Bronx 51, N. Y.

"Over 20 years experience in designing and building machinery"

CABLE ADDRESS: Machbuild New York

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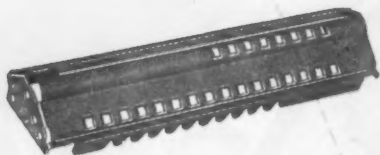
Quick Change  
Chuck



Quick Change  
Collet

## PRODUCTO *Catalog* DIE SETS

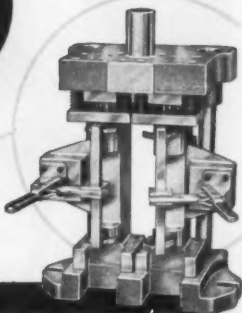
SOLVE SPECIAL STAMPING  
PROBLEM FOR MONROE



The Williams  
Stamping end-plate holes in  
the carriage cover of the  
Monroe Adding Calculator.

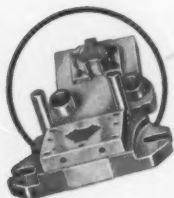


PRECISION



# PRODUCTO

*new design* DIE SETS



THE DIE MANUFACTURER,  
The Connecticut Tool  
and Engineering Co.,  
Bridgeport, Conn.



The lofty die, at right, represents the last critical stamping operation in the production of the Monroe carriage cover, shown above. It's unusual because it pierces close-tolerance end holes in either 10" or 12" covers *after* they have been assembled. The die set that controls this precise piercing operation both looks and performs like a "special" made-to-order set. Actually, it is a rear pin catalog set fitted with 1¼" x 16" pins. Even with the long guide pins, the highly accurate parallelism is maintained. Yes, Monroe is getting the benefit of a "special" without paying for extras in time and expense.

In all, 12 Producto catalog die sets are used in stamping and forming this assembly. Only the one with the long guide pins is unusual in size or shape but *all* require the utmost in precision and dependability. The point to remember is this: Whether you require a "made-to-order" special or a "quick-to-order" catalog die set, you'll get the best from Producto.

**FOR PRECISION DIE SETS FAST CALL...**

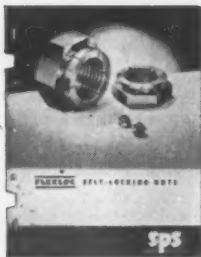
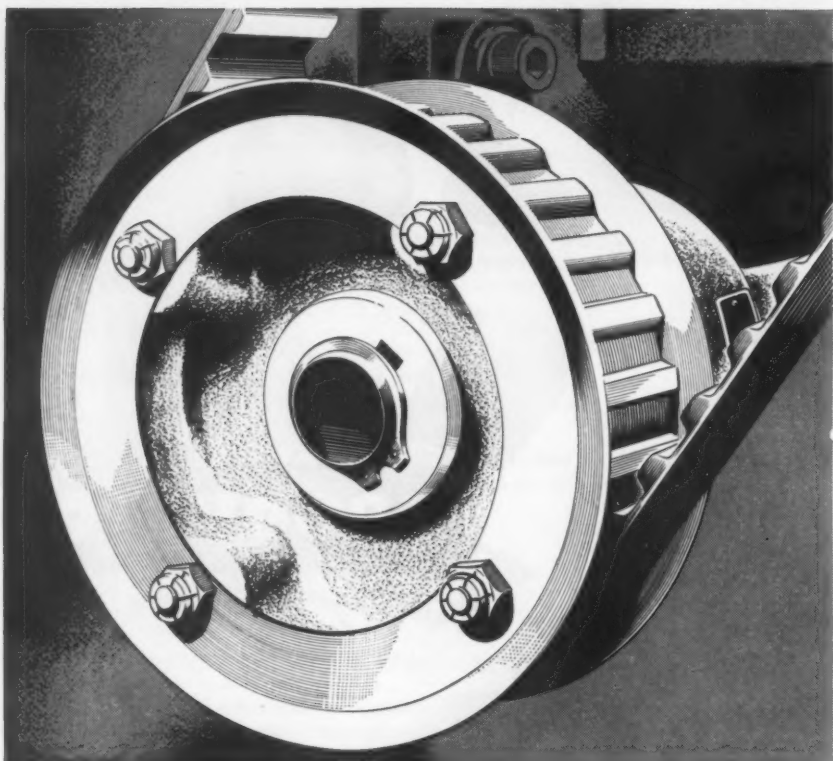
THE PRODUCTO MACHINE COMPANY • 960 Housatonic Ave., Bridgeport 1, Conn.  
ALSO MAKERS OF DIE ACCESSORIES, FEEDING EQUIPMENT, VISES, MACHINERY.



SPC48



## FLEXLOC AT WORK



**MORE AND MORE FLEXLOC LOCKNUTS** are being used to hold assemblies like this one together. This modern timing belt drive combines the flexibility of a steel cable belt with the positive action of a silent chain drive permitting its use at speeds up to 15,000 rpm.

FLEXLOC Self-Locking Nuts offer the same positive action as the drive. Once the locking threads are fully engaged, the nuts won't work loose, regardless of the vibration encountered. And FLEXLOCs are reusable.

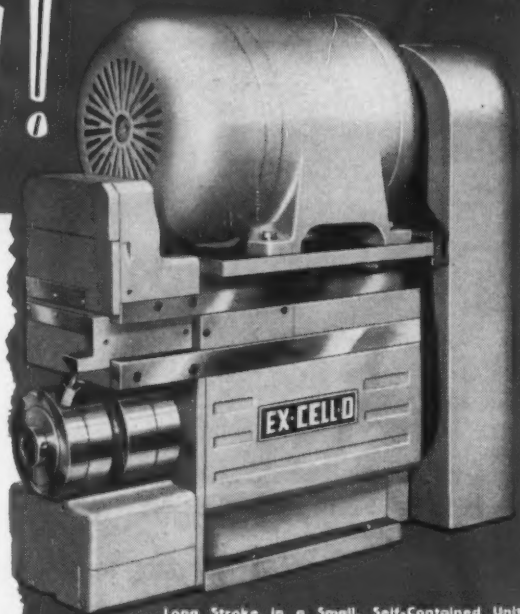
FLEXLOCs are available in a wide range of sizes in any quantity. Stocks are carried by leading industrial distributors everywhere. Write for Bulletin 866 and samples for test purposes. STANDARD PRESSED STEEL CO., Jenkintown 52, Pa.

**FLEXLOC** LOCKNUT DIVISION

**sps**  
JENKINTOWN PENNSYLVANIA

# NOW!

**The NEW  
LONG STROKE  
Style 22  
Hydraulic  
Power Unit**



Long Stroke in a Small, Self-Contained Unit. Ex-Cell-O Style 22 quill-type Hydraulic Power Unit. Capacity, 3 HP; stroke, 8". Style 22-L, 12" stroke.

For special-purpose machines at low cost use these Ex-Cell-O quill-type hydraulic power units to feed, rotate, and retract tools for drilling, reaming, counterboring, and spot-facing.

See your local Ex-Cell-O representative, or write Ex-Cell-O for literature.

## IMPORTANT FEATURES

1. Long Stroke in small rugged unit.
2. Flexible automatic cycles.
3. Two infinitely adjustable feed rates.
4. Hydraulic pump externally manifold mounted.
5. Electric and manifolded hydraulic controls enclosed, yet readily accessible.

54-45

**EX-CELL-O CORPORATION** DETROIT 32, MICHIGAN

MANUFACTURERS OF PRECISION MACHINE TOOLS • GRINDING SPINDLES • CUTTING TOOLS • RAILROAD PINS AND BUSHINGS • DRILL JIG BUSHINGS • AIRCRAFT AND MISCELLANEOUS PRODUCTION PARTS • DAIRY EQUIPMENT



## *Why* you can buy Heller Brothers files only from your distributor!

### GIVES PERSONALIZED SERVICE

Your Distributor keeps informed about new applications so that he can advise you on new types of files and their uses. He also suggests methods of proper care. He always has the Heller Brothers' representative and engineering services available to serve you.

### HAS QUICK DELIVERIES

He maintains a full stock and warehouses countless items that would otherwise tie up your capital.

### HAS COMPLETE "FOLLOW-THROUGH"

He keeps you informed on deliveries, follow-ups to meet your emergency needs, answers intelligently your questions. You're never "in the dark" with your Distributor.

### YOU CAN DEPEND ON HIM

You can get the exact Heller file you need for the job. Heller makes all American Pattern files, Swiss Pattern files, Vixen Milled Curved-Tooth files, Rotary files, Carbide Burrs, Center Laps, Internal Grinding Burrs and Counter Sinks. You can be sure he has the complete support and cooperation of America's oldest file manufacturer.



THESE 3 FAMOUS FILES ARE MADE ONLY BY HELLER

HELLER BROTHERS CO. America's Oldest File Manufacturer NEWCOMERTOWN, OHIO

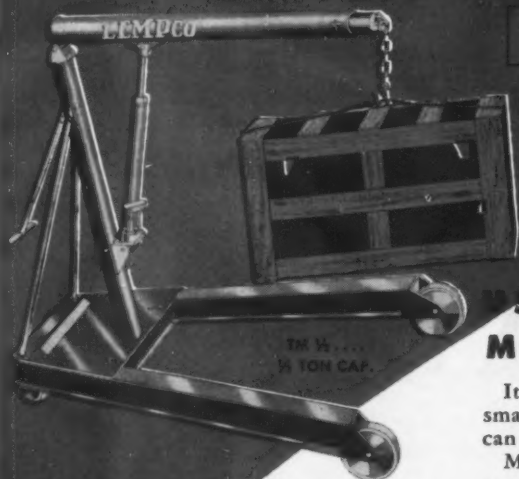
A New Jersey Corporation

Branch Offices in New York, Detroit and Chicago



**YOUR HELLER-DISTRIBUTOR CAN SUPPLY ALL YOUR FILE NEEDS**

RELEASE THAT **LIFT-TRUCK** FOR OTHER WORK



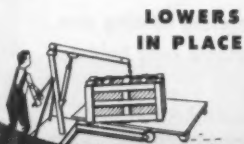
## USE LOW-COST MOBILCRANE!

It's costly to call lift trucks for small jobs. Lempco Mobilcrane can do them, more quickly, easily!

Mobilcrane, in three capacities . . .  $\frac{1}{2}$ , 1 and 2-ton . . . lifts fast, maneuvers in narrow aisles, lowers loads at a touch, UNDER COMPLETE CONTROL. Moves machinery, drums, crated materials, bales, castings . . . SAFELY and at lowest cost per job.

**LEMPCO PRODUCTS, INC.**  
INDUSTRIAL DIVISION  
BEDFORD, OHIO

WRITE FOR DESCRIPTIVE  
LITERATURE AND PRICES



# LEMPCO

for 35 years a leading  
builder of machine tools.

# THE NEW WAY TO MARK EQUIPMENT...

with

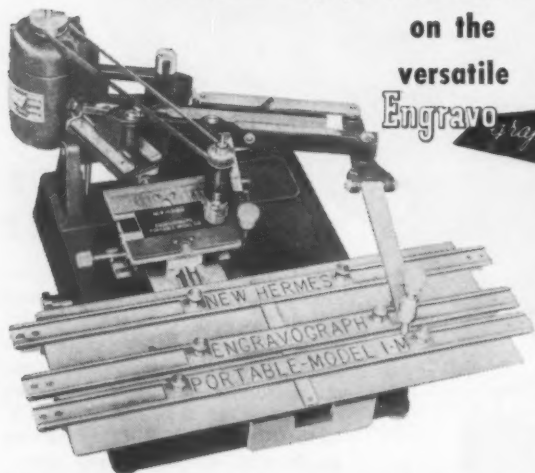
## GRAVO

*flex*

the first chip-proof, flexible engraving stock

on the  
versatile

Engravograph



So simple to engrave Gravoflex. Lettering will stand out permanently on contrasting background. No paint needed.

10,000 Engravographs in use for engraving on metals and plastics. Only the Engravograph has these patented features:

- Adjustable for 15 ratios. • Self-centering holding vise.
- Automatic depth regulator. • Adjustable copy holders.

Send for booklets

Engravograph Booklet IM-28 • Gravoflex Booklet G-28

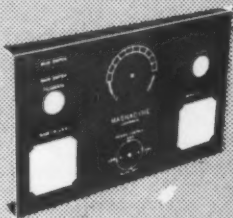
**NEW HERMES ENGRAVING MACHINE CORP.**

13-19 UNIVERSITY PLACE, NEW YORK 3, N. Y.

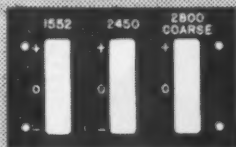
shear it



bend it



form it



punch it

# GRINDING TIME CUT 50%

**New Rotor D-4S Air Grinder  
pays for itself in 12 weeks**

**Job:** Grinding defects in holes of castings with cone wheel (size 2 1/4" x 3 1/2" x 3/8"). Formerly used 3600 rpm electric grinder (3 phase, 220v.). Job took 8 minutes—too slow.

**Solution:** Rotor Application Engineer suggested changing to Rotor D-4S Cone Grinder—speed 8500 rpm.

**Results:** Saves 4 minutes per casting; doubles output. With 50% use factor, savings paid for new Rotor Grinder in 12 weeks. Wheels last longer. Tool is lighter (only 8 1/4 lbs.); easier to handle. No tool stalling—even when crowded in hole.

Get the Rotor Engineer on *your* portable tool jobs to save *you* money!

After 12 weeks,  
it's pure  
savings!



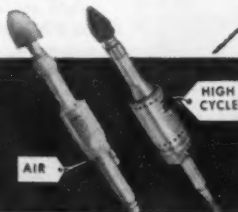
## APPLICATION

Rotor D-4 Air Grinders are available with straight or grip handle at 8500 rpm for cone wheels and 4" elastic wheels and at 6000 rpm for cone wheels, 6" elastic wheels and 4" vitrified wheels.

ASK FOR BULLETIN 43



THE **ROTOR TOOL** CO.  
CLEVELAND, OHIO



**YOU can hold a *SPEED*  
record too-**



**NEW MILE RECORD**  
Aug. 7, 1954- 3:58.8

**PERFORMANCE that will far  
out-distance obsolete  
hand methods in your  
ASSEMBLY DEPARTMENT!**

**DPS POWER  
SCREWDRIVERS and  
SELECTIVE PARTS FEEDERS  
are the answer!**

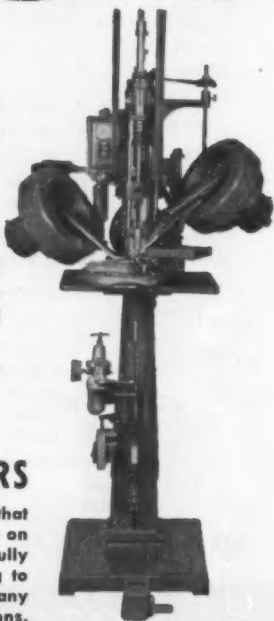
● While these champions may be tops in their field, DPS Assembling Equipment is a leading factor in the American Industrial Field—And not only in the matter of speed, (with a record of driving screws at one per second) but in economy effected through labor-saving and greater accuracy through the elimination of manual handling.

Whatever your Feeding and Assembling Operations may be, write us . . . Also send sample assembly for production estimate.



**DPS BOWL-FEEDERS**

● Designed to feed light, fragile parts that might not withstand tumbling. Operates on the VIBRATORY PRINCIPLE . . . Provides fully automatic, oriented, single line feeding to Grinding, Packaging, Inspecting and many other automatic machines and operations.



**DETROIT POWER SCREWDRIVER CO.**

**2809 W. FORT ST.**

**DETROIT 16, MICH.**



**INCREASES  
PRODUCTION...**

**LOWERS COSTS...**

**PAYS FOR ITSELF  
QUICKLY...**

The ROUSE HAND MILLER is a widely used, inexpensive, high speed, ball bearing, motor driven machine for handling light cuts in brass, aluminum, steel, plastics, and other materials—fast, accurately, and at very low cost. Only \$110.00\*

Fixtures (illustrated) extra.

Motor equipment: —1/4 H.P. 110 Volt AC 60 cycle, single phase, swivel motor mount and light—\$36.00\*

\*All prices FOB Chicago.



- ★ **MILLS SMALL PARTS MUCH FASTER.**
- ★ **DRASTICALLY CUTS YOUR INVESTMENT IN EQUIPMENT.** Replaces expensive production machinery—or releases it for other jobs.
- ★ **INEXPERIENCED HELP CAN OPERATE IT.** Safe, simple, fool-proof operation.
- ★ **NO MORE COSTLY SET-UP TIME. \$110.00\*** price so low that it pays to keep one or more Hand Millers always set-up for special operations.
- ★ **YOU GET A BETTER PRODUCT**—the result of ABSOLUTE ACCURACY.
- ★ **A LOSS BECOMES A PROFIT** when marginal pieces are finished on the Hand Miller instead of on high cost equipment.
- ★ **VERY LOW MAINTENANCE.**
- ★ **USED REGULARLY IN 1163 MANUFACTURING PLANTS** (some of which use as many as 30 machines)—yet on the market a scant few years.
- ★ **UNIQUE—VERSATILE.** Nothing else like it. One or several machines can be the answer to some of your production problems.

**Write today  
for further  
information.**

**H. B. ROUSE & COMPANY**

2214 N. WAYNE AVE., CHICAGO 14  
50 YEARS OF SERVICE TO INDUSTRY

# Keep your eye on **Buckeye**

and these  
completely  
different  
pocket-size  
air tools



You've never seen air tools like the NEW Buckeye L Series drills, screwdrivers and nut runners. A tornado of air power, hushed to a gentle purr, is packed into these little tools, built for full-scale production use.

Now—enjoy the advantages of Buckeye power tool operation on any drilling or fastening job, even those on which tools are used only intermittently. With these new L Series tools available, manual drilling, screwdriving and nut running becomes an expensive, outmoded luxury.

Just send a letter or postcard with your name, address and the words "L Series Tools," and we'll forward complete information by return mail.

# Buckeye Tools

CORPORATION

DIVISION 14 • DAYTON 1, OHIO

producers of  
the world's first  
successful  
rotary air tools



# CLEEREMAN JIG BORERS

## Precision—

by

## CLEEREMAN

... for ultra-fine tolerances on  
highest quality gage, tool,  
die, jig and fixture work—and on  
"jigless" production

... to stand the gaff in today's high  
pressure tool room and production  
plant service

... for higher profits and  
higher output through the  
ultimate in operating  
ease and efficiency



**AFFILIATED  
WITH**

**CLEEREMAN MACHINE TOOL CO., Green Bay, Wis.**  
**BUILDERS OF PRECISION JIG BORERS AND DRILLING MACHINES**



This Staples Carbide-Tipped Shell Type Expansion Reamer has won unchallenged leadership for low cost, high precision reaming in mass production. In automotive, aircraft engine, household appliance, farm machinery and many other metalworking industries, this Staples tool is daily proving its ability to produce close tolerance, fine finish work at exceptional tool cost savings.

When the tool wears undersize, it can be accurately expanded to original diameter by driving the shell up the tapered arbor. After repeated sharpening and expansion, the tool is returned to new condition simply by replacing the worn shell—a standard stock item.

Enthusiastic comments from many manufacturers attest to the real savings this Staples Reamer produces. Try it on your production lines. Your inquiry will bring a prompt response.

## **Staples** CARBIDE-TIPPED CUTTING TOOLS

A complete line of Circular Carbide-Tipped Tools, Expansion Reamers—Special Tools

**THE STAPLES TOOL COMPANY**  
CINCINNATI 25, OHIO

# NEWEST



## 3 HORIZONTAL BORING MILLING and DRILLING MACHINE

### PENDANT CONTROL

*Complete machine control  
from a movable station for feed  
and speed selections,  
directional feed and traverse for  
Spindle, Head, Table and Saddle*

### ADDITIONAL FEATURES

Both Screw and Rack  
Feed to the spindle

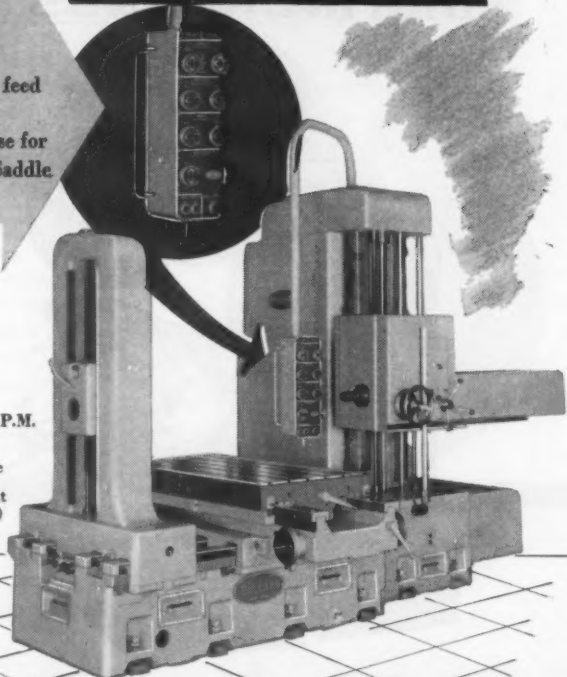
Massive 4-Way Bed, Head,  
Headpost and Rear Post  
for rigidity

Spindle Speed up to 2000 R.P.M.

Replaceable Ways, chrome  
hardened, on Bed and Saddle

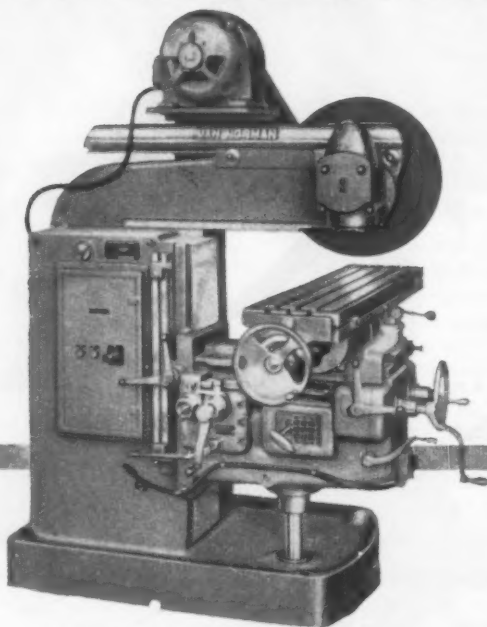
Optical measuring equipment  
for head and table (optional)

FOR FULL INFORMATION  
CALL YOUR NEAREST  
BULLARD SALES OFFICE, OR  
DISTRIBUTOR OR WRITE . .



**THE BULLARD COMPANY** | BRIDGEPORT 2,  
CONNECTICUT

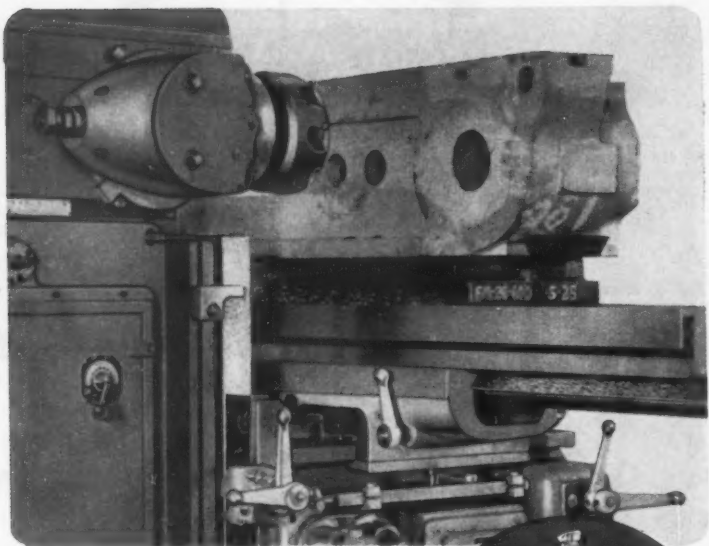
**...EVERY**  
**Van Norman Ram Type Miller**  
**Gives You EXTRA "CUT-ABILITY"**  
**that INCREASES Production**



No. 38-M Ram Type Miller  
Table: 64" x 14"  
Cutterhead Spindle Motor: 10 H.P.  
Feed Motor: 1½ H.P.  
Ram Movement: 29"  
18 Feeds; 12 Speeds

**VAN NORMAN**

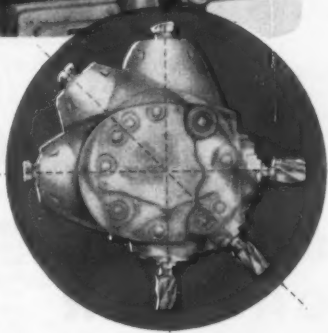
MANUFACTURERS of—Ram and Column Type Milling Machines, Cylindrical Grinders, Spline and Gear Grinders, Oscillating Radius Grinders, Special Production Grinders, Centerless Grinders.



You simply can't beat the new Van Norman Ram Type Millers for "Cut-Ability". The powerful spindle motors drive the cutterhead only . . . provide ample power for every milling cut with all types of cutters including *carbide cutters*. The extra heavy movable rams plus larger, heavier column, base and knee, saddle and table assemblies provide maximum rigidity.

Find out how you can increase production, cut milling costs with the new modern Van Norman Ram Type Millers. Write:

*Don't wait . . . for extra profits install a Van Norman machine now! They are available on four purchase plans — Outright sale . . . Purchase on conditional sales contract up to 5 years . . . Straight lease . . . Lease with option to buy. See your dealer or write Van Norman Company.*

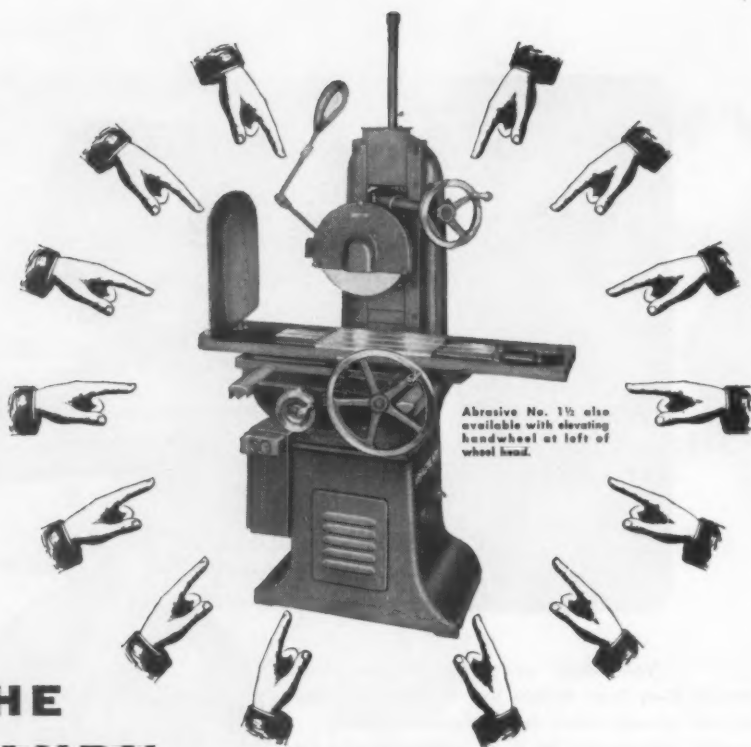


**Adjustable cutterhead  
permits horizontal,  
angular or vertical  
milling on  
ONE MACHINE**

# COMPANY

**SPRINGFIELD 7,  
MASSACHUSETTS**





Abrasive No. 1 1/2 also available with elevating handwheel at left of wheel head.

## THE HANDY SURFACE GRINDER

**ABRASIVE No. 1 1/2** is the hand feed toolroom grinder designed for maximum handiness. Handiness — to quickly produce different jobs regardless of size, with its 15" x 10" work table. And handiness that pays off in toolmaker popularity. Large convenient handwheels, for controlling depth of cut and longitudinal and crossfeed movements, make any precision grinding job a fast one on the Abrasive No. 1 1/2.

The many one-of-a-kind jobs which can tie up your toolroom are easily handled by Abrasive No. 1 1/2. Your proof of this grinder's versatility can be seen in the thousands of shops where this grinder is producing at least 25 jobs a day.

Standard equipment — 1 H.P. motorized spindle. Available with 2 H.P. spindle at slightly increased price.

For complete specifications, send for Abrasive No. 1 1/2 Catalog. Abrasive Machine Tool Company, 14 Dunellen Road, East Providence 14, R. I.



**ABRASIVE QUALITY IS REFLECTED IN THE FINISH OF YOUR PRODUCT**

# Tough grinding jobs?

Check ***Vulcanaire***  
high speed precision  
grinding heads!

Many seemingly impossible grinding problems have been solved by adapting Vulcanaire to standard machines or by using one of Vulcan's specially designed machines.

On Surface Grinders, merely remove wheel and guard, clamp vertical or horizontal adaptor to machine as illustrated. No belts necessary. For instance, Vulcanaire used in connection with Vulcan's Rotary Table and Magnetic chuck.

Adaptors are in stock to fit the spindle of Vertical Milling Machines for grinding contours, holes and slots.

On Internal Grinding Machines Vulcanaire's infinitely controlled speeds furnish the correct surface cutting speed resulting in faster production and micro finish. The adaptor sleeve fits into present housing.

Applied to Jig Boring Machines, Vulcanaire is liked by leading precision manufacturers because its accuracy is guaranteed, producing Vulcanaire jig grinding of large and small parts.

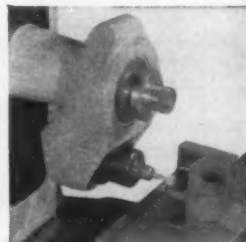
*Send us a blue print on your toughest grinding problem. Recommendations and sketches will be returned to you — no obligation.*



Grinding circular slot using Vulcan's Rotary Table and Magnetic chuck.



Vertical adaptor for Surface Grinders. Grinding small slots



Horizontal application Grinding a Shoulder Punch.

## Major Vulcan Services

Engineering, Processing, Designing and Building . . . Special Tools . . . Dies . . . Special Machines . . . Vulcamatic Transfer Machines . . . Automation . . . including the Vulcan Hydraulics that Form, Pierce, Assemble and size. Vulcanaire Jig Grinders . . . Motorized Rotary Tables . . . Plastic Tooling.



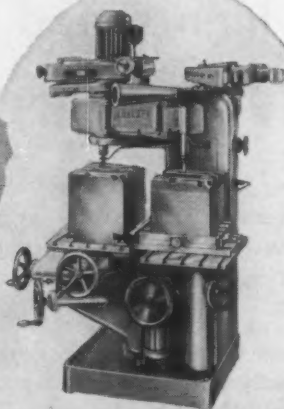
## ECONOMICAL, ACCURATE PRODUCTION

OF DIES AND MOLDS  
WITH THE LATEST

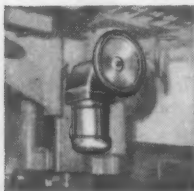
# DECKEL

### universal pantograph DIE SINKING MACHINE model KF12

Deckel die sinking machines are justly famous for their accuracy, production rate, and ease of operation. The KF12, latest and largest Deckel model, does heavy die-sinking jobs which formerly required much greater investment in equipment. Spindle speeds from 60 to 10,000 r.p.m. enable you to do rough and finish milling, as well as light engraving, on the same machine. The newly developed, "mirror image" milling attachment produces right and left hand dies and molds from the same pattern. Other important features are illustrated below.

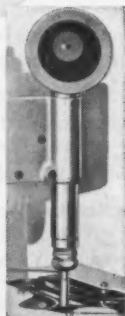
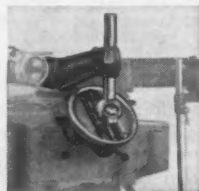


Deckel KF12 makes rapid, accurate enlargements or reductions from 1:1.5 to 1:4 as well as 1:1 duplication. The cutting tool covers an area up to 15 3/4" x 15 3/4" or up to 10" x 19 3/4".



Saddle elevating motor rapidly raises or lowers master and workpiece at the same time.

Circular forming attachment permits generating spherical shapes.



Optical contacting device makes rough milling faster, more accurate. And, accurate rough milling reduces time for finishing.

Get in touch with us soon for information on this or other Deckel machines:

2-DIMENSIONAL ENGRAVERS • 3-DIMENSIONAL ENGRAVERS  
UNIVERSAL MILLERS • UNIVERSAL TOOL & CUTTER GRINDERS

# COSA

—nationwide sales and service of precision machine tools—  
—from bench lathes to boring mills.

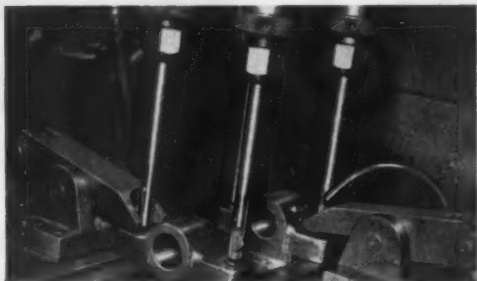
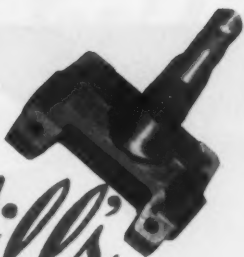
COSA CORPORATION, 405 LEXINGTON AVENUE, NEW YORK 17, N.Y.

# revolutionary

THAT'S

# Cogsdill's

DEBURRING AND  
CHAMFERING TOOLS



"Revolutionary" is the word used to describe the new, easy and convenient method of removing burrs, fins and other hole irregularities. With Cogsdill **BURRAWAY** tools, even unskilled operators can do top quality work. This means lower costs, fewer rejects and faster production. For example, in multiple spindle machines, the **BURRAWAY** eliminates a hand or secondary operation. **BURRAWAY** is just as big a time-saver on single spindle machines and even on Portable Power Tools. You'll want to learn more about **BURRAWAY**. That's the reason a 12-page fact-filled and well illustrated booklet has been prepared. Send today for yours . . . no obligation.

PAT. NO. 2620689

## Cogsdill

TOOL PRODUCTS, INC.

2100 WEST EIGHT MILE ROAD  
ANN ARBOR, MICHIGAN



## TAPMATIC

### THE MODERN SOLUTION TO TAPPING PROBLEMS

#### CONSISTENTLY UNIFORM THREADS

BECAUSE . . . taps float "weightlessly" in and out of the hole. The exclusive patented "Tapmatic Floating Action" feature eliminates human errors and results in consistently uniform threads.

#### FASTER TAPPING PRODUCTION

BECAUSE . . . tapping is not dependent upon operator's sensitivity and "reflex-actions." Steady, precise mechanical action takes over as Tapmatic "thinks for the operator." Production becomes fast and profitable.

#### LONGER TAP LIFE

BECAUSE . . . the "Tapmatic Floating Action" and the "Tapmatic Positive Torque Adjustment Clutch" combination eliminates "lead pressure"—stress on taps is drastically reduced. Tap life increase ranges up to 400%.

#### LESS TAP BREAKAGE AND WORK SPOILAGE

BECAUSE . . . the positive torque adjustment clutch *stops tap instantaneously* when tap becomes dull, loaded or bottoms in blind hole tapping.

Write For Free Literature on TAPMATIC Attachments

# TAPMATIC

CORPORATION

845 West 16th Street • Costa Mesa, California • Phone Liberty 8-3404

# *the ONE COMPLETE Tool Line*



**You Can't Afford to Miss  
at the A. S. T. E. Western  
Industrial  
Exposition**

Yes, for the best answer to every tooling need, Davis is the one line you'll want to inspect with care. It offers you unrestricted selection from the broadest standard line of boring, turning and planing tools . . . plus the most advanced and efficient special-engineered tooling designs produced in the industry.

# DAVIS

**BORING TOOL DIVISION OF**

**Giddings & Lewis Machine Tool Company  
Fond du Lac, Wisconsin**

**THE ONE NAME THAT CERTIFIES ULTIMATE PRECISION AND PRODUCTIVITY IN TOOLING**

**Booth 454** SHRINE AUDITORIUM  
AND EXPOSITION HALL



*Faster* ANGULAR SET-UPS  
WITH GAUGE BLOCK ACCURACY  
**MAGNA-SINE**

○ N angular set-ups the Magna-Sine saves hours of set-up time, provides positive accuracy, holds work securely without distortion.

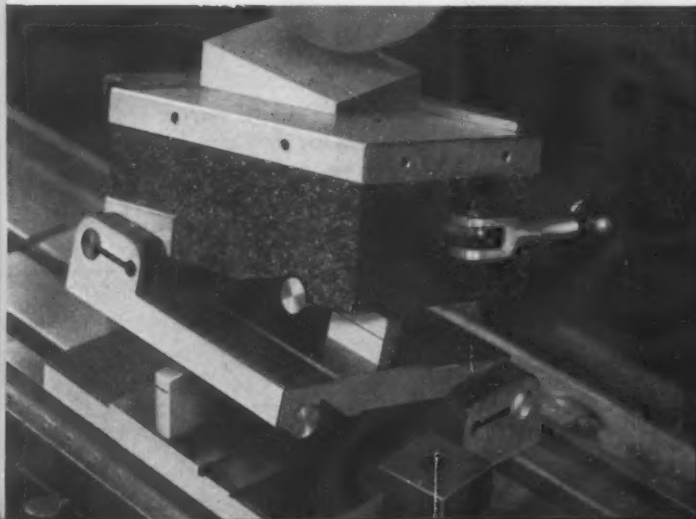
The Magna-Sine is a quality permanent-magnet chuck mounted on precision hardened and lapped hinged plates. A Table of Constants provided, quickly shows the standard gauge blocks to insert between the plates for any angle—single or compound. Set-ups to gauge block accuracy take minutes, not hours! When closed, the Magna-Sine is used as a conventional magnetic chuck. Thousands are in daily use.

*Write for your free copy of the Magna-Sine Catalog  
which shows all styles and sizes . . . price list is included.*

**OMER E. *Robbins* COMPANY**

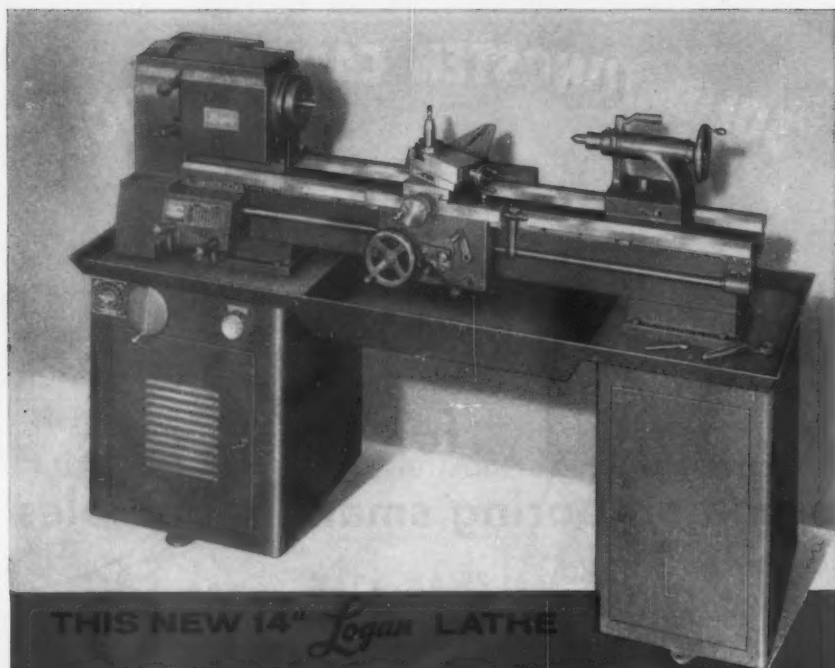
**Dept. A-1, 24800 PLYMOUTH RD. • DETROIT 39, MICHIGAN**

*Also producers of special gauges and fixtures*



*for*  
GRINDING  
INSPECTION  
DRILLING  
BORING  
**AT**  
**ANY**  
**ANGLE**





THIS NEW 14" *Logan* LATHE

**PERFORMS...**

AND THE RESULTS PROVE ITS SUPERIORITY

The more jobs you watch this rugged new Logan "6560" perform, the more impressive it looks. On the heaviest cuts, or at maximum speed, it turns the work *smoothly*, quietly, with precision results. Superior performance is designed, engineered and built into it.

The Variable Speed Drive provides instant spindle speed correction. The oversize spindle, with 1½" bore, turns on a ball bearing mounting that needs no adjustment within the full range of 38 to 1200

rpm. The bed is a wide, deep special alloy casting, extra heavy and resistant to both internal and external stresses. The two V-ways and two flat ways are precision ground. Extra strength and weight throughout, plus dynamic balancing of the complete lathe practically eliminates vibration. Moderate price and low cost operation make the "6560" outstanding in economy as well as in precision performance. Write for Bulletin 14-L, giving a full description.

#### SPECIFICATIONS AND FEATURES

14½" swing over bed  
9" swing over saddle  
1½" spindle hole  
1" collet capacity  
40" between centers

Variable Speed Drive  
Ball Bearing Spindle  
38 to 1200 rpm

Two-V-way, Two-flat  
way, Precision  
Ground Bed  
Precision Carriage

LOOK TO LOGAN FOR BETTER LATHES AND SHAPERS

**LOGAN ENGINEERING CO.**

Lawrence and Lamar Aves., Chicago 30, Ill.

# SOLID TUNGSTEN CARBIDE TOOLS

for  
precision boring small, deep holes

If you have the problem of precision boring *deep, small holes* you'll get maximum results if you come to Bokum. You'll save because you'll be able to hold to exceptionally close tolerances—complete the boring operation often in one pass rather than several.

And you'll save with extra-long tool life, too. Shanks are made of a tough grade carbide for maximum strength and rigidity. Clearance is retained throughout the life of the tool, the shape of the cross section remains constant, and resharpener is required on the top face only. Tools are furnished in two of the highest grade materials recognized for wear resistance. TC-4 for boring cast iron and non-ferrous materials and TC-8 for finish boring of steel.

Write today for catalog 948. It's packed with information you can use.

Dept H



4237



TRADE MARK REG. U. S. PAT. OFF.

## BOKUM TOOL CO.

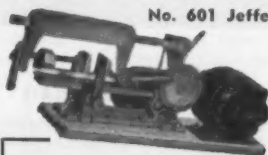
14775 Wildemere Ave.,  
Detroit 38, Mich.

# 10 models

efficiently designed to give you maximum output

# 5 capacities

to meet your requirements more economically



No. 601 Jefferson

## 10 MODELS — 5 CAPACITIES

You will find Keller Power Hack Saws from the smallest 4"x4" to the largest 9"x9" capacity—both floor and bench models.

### KELLER power HACK SAWS

save you money. Cut bars, rounds, and pipes fast, accurate, and more economically. Keller Saws have more features to give you lower operating and maintenance costs and longer blade life, while increasing output.

Five  
Capacities:

4"x4", 5"x5",  
6 3/4"x6 3/4",  
7"x7", and 9"x9"

Write for colorful illustrated catalog with specifications and low prices today.

**SALES SERVICE MACHINE TOOL CO.**  
2357 University Avenue, St. Paul 14, Minn.



No. 5 Hy-Duty

# KELLER

P O W E R   H A C K   S A W S

# Cut Setup and Inspection Costs

with these  
**TAFT-PEIRCE Specialties for Precision Work**



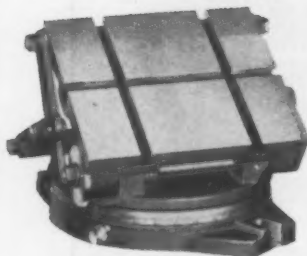
**FOR SETUPS**

## **T-P COMPOUND SINE ANGLE PLATE**

offers a fast, accurate way to set up angles from 0 to 90 degrees in two planes simultaneously. 6" x 6" base. Simple Sine Angle Plate also available.

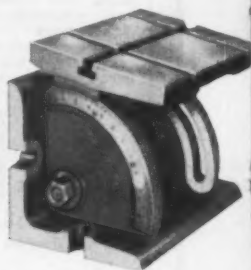
## **T-P TOOLMAKER'S ADJUSTABLE KNEE**

simplifies inspection or setup of angular work. Graduated quadrant and vernier reads to 5 minutes of angle.



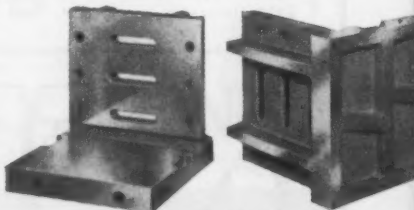
## **T-P ADJUSTABLE ANGLE PLATE**

tilts and turns. Makes compound angles easy to set up for machining. Both tilting table and rotating base are graduated from 0 to 90 degrees in each direction.



## **T-P SINE BARS & SINE BLOCKS**

First conceived and built by Taft-Peirce, they locate work to any given angle within very close limits. Blocks have tapped holes for clamping.



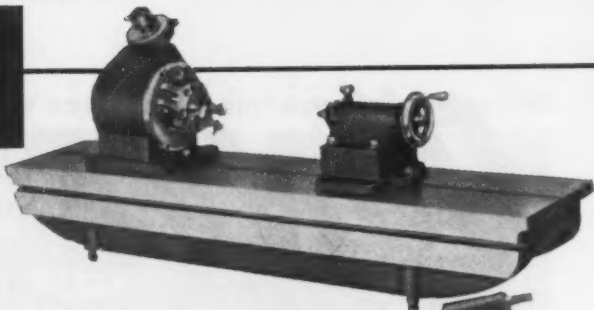
## **T-P MULTIPLEX ANGLE IRONS**

All surfaces are scraped accurately flat for faster, easier setups. Other types available include Duplex Angle Irons, Slotted Angle Irons, Toolmaker's Knees, and Measuring Irons.

## FOR INSPECTION

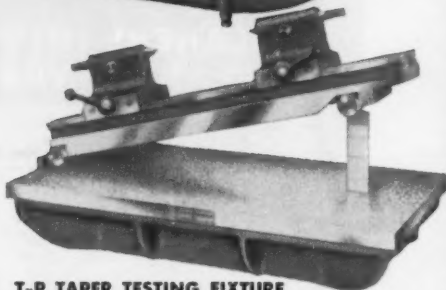
### T-P DIVIDING HEAD

offers a rapid, accurate means of dividing the work circle. Used in measuring and inspecting splines, gears, cams, and other parts. Direct readings to 6 seconds of arc.



### P BENCH CENTERS

simplify inspection of cylindrical work. Have unusual rigidity and permanent accuracy. This is typical of wide range of inspection tools available at Taft-Peirce.



### T-P TAPER TESTING FIXTURE

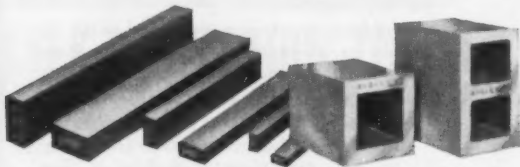
combines a 20° Sine Block with a pair of adjustable mounted precision centers. Checks tapers to high degree of accuracy.

## FOR SURFACE REFERENCE



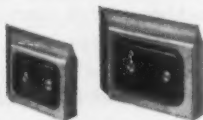
### T-P GRANITE SURFACE PLATES

Extremely fine grain of T-P granite surface plates provides smoother, more wear-resistant surface. Assures top precision over longer periods. Cast iron surface plates also available.



### T-P STEEL AND BOX PARALLELS

are available in a complete line of stock sizes. Also, Planer and Boring Machine Parallels, Levelling Straight Edges, and Steel Straight Edges.

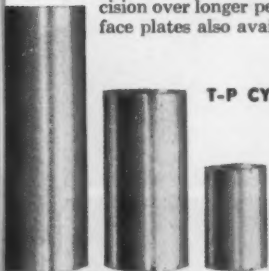


### T-P UNIVERSAL SQUARES

High precision squares that can be used in any position. Hard rubber center facilitates gripping . . . prevents hand heat from reaching block.

### T-P CYLINDRICAL SQUARES

Used with T-P Surface Plate, they provide a convenient accurate reference line for any vertical work-surface.



**THE TAFT-PEIRCE  
MANUFACTURING  
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For the complete story on these items and many more, write for your copy of the Taft-Peirce Handbook.



*T-P means  
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MILLING HEAD**

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\*Trade-Mark

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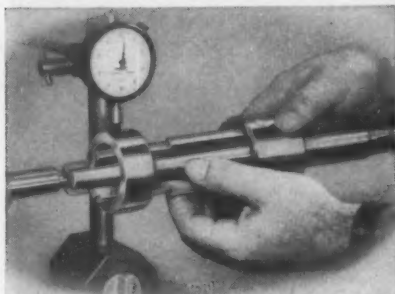
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The Brush Development Co.  
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that saves money . . .



Le Count Mandrel used to inspect aircraft bearing.

## 11 LeCOUNT EXPANDING MANDRELS REPLACE OVER 400 SOLID ARBORS

And provide guaranteed concentricity to .0002" T.I.R.!

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**MARCH  
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**NEW THREAD GAGE SELECTOR**—a complete pocket-size tabulation of basic data for thread plug and ring gages, both fractional and numbered sizes from No. 0 to 1 1/2".

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Ask your Threadwell distributor for these two new members of the Threadwell service family. Ask him too about the long service life of Threadwell's fine cutting tools and gages.



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COMPLETE LINE OF HIGHEST PRECISION GAGES

THREADWELL DISTRIBUTORS, too, are strategically located to serve you promptly, properly, and well.



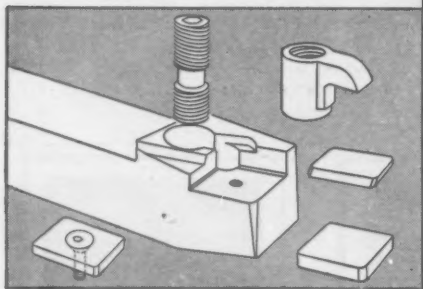
THE FINEST IN CUTTING TOOLS & GAGES

# NEW KENDEX\* TOOLING costs less on all 3 counts

... initial cost, tool cost per piece  
and parts replacement cost

Each component of the new Kendex Tooling has been designed with but one thought in mind... lowest possible cost per cutting edge.

The holders are of simple but sturdy construction, and have the capacity to take deep cuts in a wide variety of operations. The clamp lifts for quick, accurate indexing, and is so designed that clamp forces are in the same direction as cutting forces—not opposed to them, eliminating counter stresses. Hardened, replaceable shims, on all but the smallest size, protect the shanks against accidents with the tools. There is no complicated seat adjustment mechanism to weaken the Kendex shank. Kendex "turnover" inserts fit perfectly into place in



accurately ground seats, and are supported by solid, heat-treated shanks. Center height of the cutting point is constantly maintained.

The new Kendex is available in a range of sizes in nine styles and two models: the Standard Tool used with or without replaceable chipbreakers; the Heavy Duty model, with low cost, replaceable chip deflector, for cutting heavy and irregularly shaped forgings or castings where depth of cut may vary as much as one inch from side to side. Both models use "throw-away" inserts... eliminate grinding.

To learn how you, too, can cut machining costs on all three counts, call your Kennametal representative, or write to KENNAMETAL INC., Latrobe, Pennsylvania.

\*Registered trademark

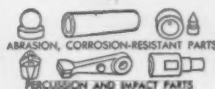


MINING, METAL AND WOODWORKING TOOLS

WEAR AND HEAT-RESISTANT PARTS

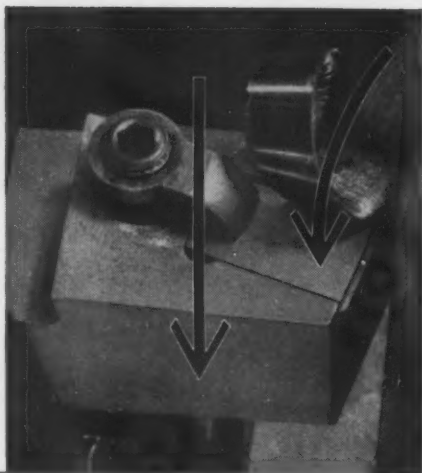


INDUSTRY AND  
**KENNAMETAL**  
...Partners in Progress



ABRASION, CORROSION-RESISTANT PARTS

PURCHASING AND SHIPMENT PARTS



The effectiveness of the rugged Kendex holder can be measured by its capacity to take a variety of cuts, from extra light to very deep, using the same tool.

Clamp forces are in same direction as cutting forces—and not opposed to them. This is indicated by the arrows in the above photograph. Counter stresses are thus eliminated, adding to tool life.

← The new Kendex is simple in design with a minimum of parts... no complex mechanism to adjust or fail.

"Throwaway" type inserts index quickly and accurately in the rugged, heat-treated shank, with cutting edge perfectly aligned. Clamp has sufficient travel to hold insert when carbide chipbreaker is not used. Shim (where used) screws to holder.

The table below gives a comparison of initial cost of Kendex holder and hardware with a comparative competitive tool. Note the low cost of replacement parts for the Kendex KAR 16.

## TOOL COST COMPARISON

(1"x1" shank, without inserts)

Toolholder "A"		Kendex KAR 16	
Holder only.....	\$25.00	Holder only.....	\$ 8.00
Hardware:		Hardware:	
Chipbreaker plate.....	3.50	Shim†.....	.90
Elevator.....	4.25	Clamp.....	1.25
Main screw.....	1.00	Clamp screw.....	0.15
Chipbreaker plate screws.....	0.35		
Total initial investment.....	\$34.10	Total initial investment.....	\$10.30

†Hardened, replaceable shim absorbs stresses of any possible overloading beyond tool capacity. Inserts last longer and machining costs are held to a minimum.

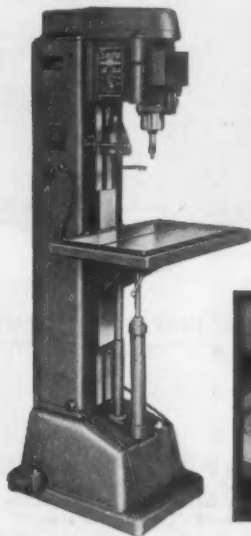
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**Quicker changeover,  
lower tooling costs...**

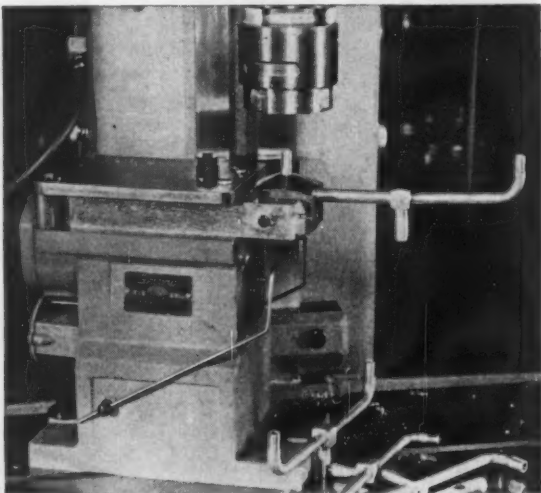
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Basic Master Fixtures for DRILLING, THREADING or TAPPING. Snow universal machines are the most flexible, most efficient, and most economical known. They save countless dollars in change-over time — help you start jobs sooner — assure quality at high production rates.

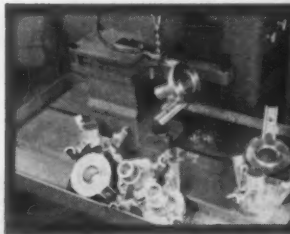
The square footage under a Snow Machine in your factory can be the most profitable in your whole plant. Submit details of your requirements.



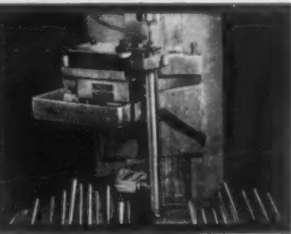
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AIR CONTROLLED  
AUTOMATIC OR  
SEMI-AUTOMATIC**



**AIR VISE** holds part firmly — self-centering — always in exact position for precision work. U-shaped wire underneath provides quick finger-tip control, automatically starting spindle cycle. Jaw inserts keep tooling costs at minimum. Blank jaws always in stock — can be tooled to fit your part promptly, inexpensively.



Irregularly shaped parts are easily handled. Front feed permits close setting of guide plate for greater accuracy with high production.



Here a short **AIR VISE** mounted on an offset table holds long tubing. Piece-part switch under table automatically closes vise and starts tapping operation.

**SNOW MANUFACTURING CO., BELLWOOD, ILL.**

(Suburb of Chicago)



for  
**ACCURACY** +

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A rugged foundation for accurate work. Built-in screw-type leveling jacks.

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BED —  $7\frac{3}{4}$ " wide,  $5\frac{1}{4}$ " deep. Two Vee, two flat ways and underside of bed are precision-ground.

THREAD RANGE — 48 selections, 4 to 224 Standard, right or left.

SPINDLE SPEEDS — Countershaft Drive, 8 (50-1300 R.P.M.)

Variable Speed Drive, Infinite (30-1400 R.P.M.)

POWER LONGITUDINAL FEEDS — From .0013" to .009" (left or right) per revolution of spindle.

TAILSTOCK —  $1\frac{3}{8}$ " diam. ram, 3" travel. Ram graduated 0 to 3" by  $\frac{1}{16}$ ths. No. 3 Morse Taper. 1" set-over.



# the **PLUS** value of CLAUSING Lathes!

The exceptional performance of the CLAUSING 6300 Series Lathe on production, tool room, research or maintenance work is a direct result of its many built-in CLAUSING *Plus* values. The headstock is fully enclosed and all moving parts run in a pumped bath of oil. Spindle is forged, precision-ground steel with  $1\frac{3}{8}$ " bore and 1" collet capacity . . . turns on "Zero-Precision" Timken tapered roller bearings. Hardened and ground spindle nose, L-00, is tapered key-locked type. Dual A-belt drive with spindle pulley mounted outboard. Quick-change mechanism provides instant selection of 48 threads or feeds. Both quick-change mechanism and double-walled apron are enclosed and gears and shafts run in bath of oil. For accuracy, capacity, efficiency and economy, there's nothing like the CLAUSING 6300 at or near its price!



**FULLY ENCLOSED HEADSTOCK**

Spindle turns on widely-spaced "Zero-Precision" Timken tapered roller bearings with tolerance of .00015".



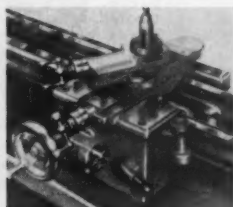
**ENCLOSED OUTBOARD DRIVE**

With dual-belt outboard drive, replacing belts is a quick, easy job — no need to disassemble headstock and spindle. Variable speed drive optional.



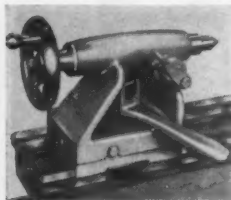
**QUICK-CHANGE MECHANISM**

Quick-change gear box is fully enclosed. Has oil bath lubrication,  $\frac{1}{2}$ " wide steel gears, exclusive over-ride clutch.



**DOUBLE-WALLED APRON**

Thick-walled apron is fully enclosed. Has built-in safety lock, oil bath lubrication.



**HUSKY TAILSTOCK**

Has No. 3 MT ram with tang socket . . . holds tools without slippage. Long key guide that absorbs heavy torque loads.

## CLAUSING 6300 LATHES MUST PASS RIGID TOLERANCE TESTS SUCH AS:

1. Spindle Nose Runout, total indicator reading . . . . . 0 to .0003".
2. Spindle Taper Runout, at end of 12" test bar . . . . . 0 to .0006".
3. Headstock Alignment (horizontal) at end of 12" test bar . . . . . 0 to .0003".
4. Tailstock Spindle Alignment (vertical) High at end of spindle when fully extended. . . . . 0 to .0008".
5. With work mounted in chuck, lathe must turn round within . . . . . .0003".



**SPINDLE NOSE**

Tapered key-locked type, hardened and ground. Spindle can be reversed or braked without danger of the chuck's coming off.

See YOUR NEAREST ATLAS CLAUSING DEALER OR Write FOR ILLUSTRATED CATALOG

**CLAUSING DIVISION**, QUALITY MACHINE TOOLS SINCE 1911  
*Atlas Press Company*  
**3-107 N. PITCHER ST., KALAMAZOO, MICHIGAN**

CLAUSING HEAVY-DUTY MACHINE TOOLS • ATLAS METALWORKING MACHINE TOOLS • ATLAS WOODWORKING POWER TOOLS



HERE'S A

# Frame-up

**TO GIVE YOU MORE FOR YOUR MONEY**

These two new Star Hack Saw Frames provide convenience features and quality features found in no other frames.



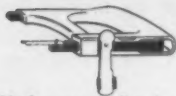
**NEW  
STAR No. 10**

Green Tenite handle, one-piece, heat treated, solid steel back with long-wearing, rust-proof, crackle finish, and 12-inch Star Unbreakable Special Flexible Blade,

**\$189**

LIST PRICE

**EXAMPLE:**



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**EXAMPLE:**



A quick simple movement of the tension bar adjusts for 10-inch or 12-inch blades.



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LIST PRICE



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LIST PRICE

**STAR  
No. 20**

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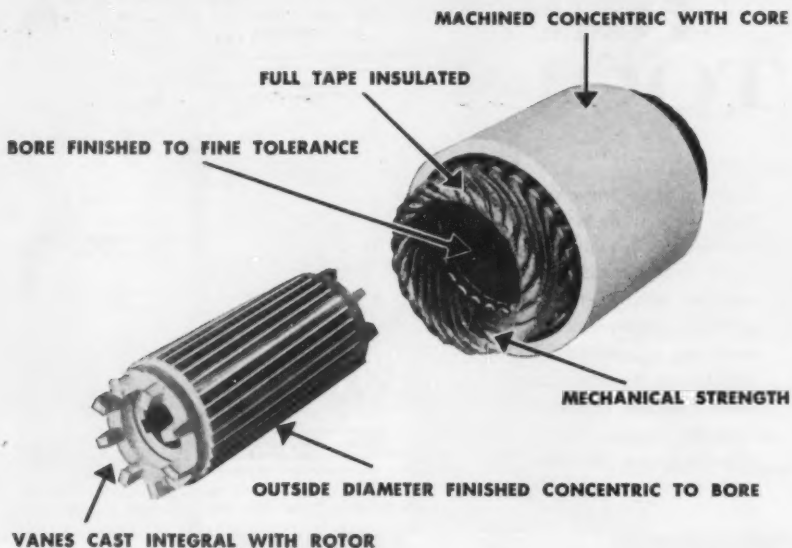
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*Serving the Industry Since 1852*



## WOODS SHAFTLESS MOTORS



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Let us tell you how you can achieve a reduction in production costs by direct motor drive.

**MOTOR DIVISION**

**S. A. WOODS MACHINE CO.**  
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**BOSTON 27, MASS.**

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economical move**

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Realizing that a Screw Machine or Turret Lathe is only as good as the tools used on it, leading manufacturers\* supply R and L TOOLS as original equipment with their machines. Get the most from your machinery . . . change to R and L TOOLS now! They'll pay for themselves and the replaced tools in no time through reduced set-up time and greater precision.

\*List of manufacturers supplied on request.

*Write for new catalog*



R and L TOOLS  
1825 ARISTOL ST.

- ☐ Please send me your new catalog  
☐ Please arrange for no-obligation demonstration of R and L TOOLS

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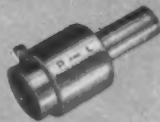


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## R and L TAP AND DIE HOLDERS . . .

feature a new release mechanism, (exclusive with R and L), which makes right or left threading possible.



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Half the weight . . . twice as efficient as other knurling tools . . . One hex wrench makes all adjustments, thereby cutting set-up time to a minimum.

## R and L UNIVERSAL TOOL POST . . .

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## R and L RECESSING TOOL . . .

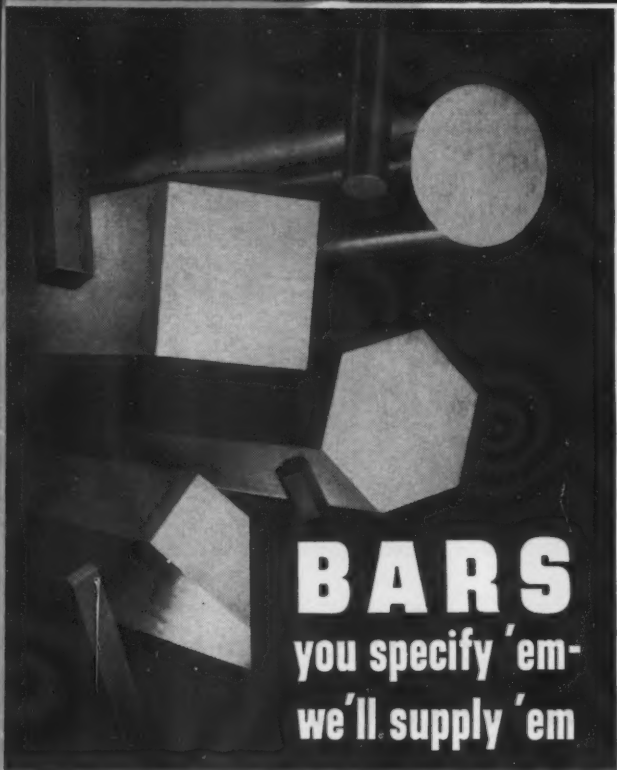
Newly designed . . . adjustable to operate on both internal and outside diameters, with spindle running right or left. It can be adjusted to handle any diameter within capacity of the machine.



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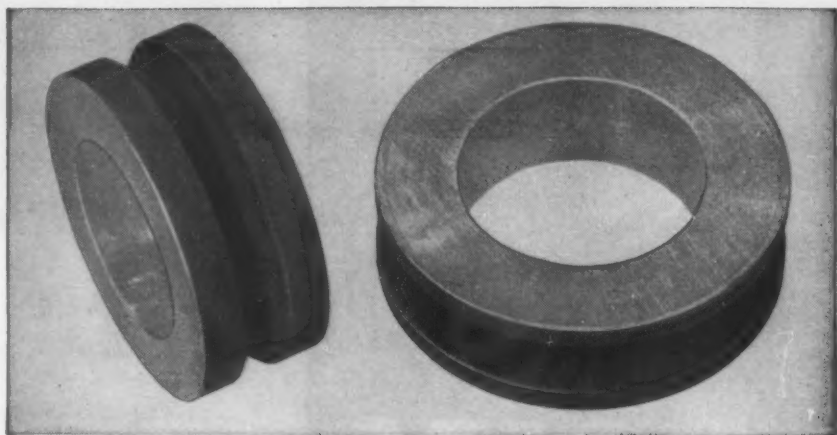
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Deep grooves worn in straightening rollers by small diameter wires often badly score larger wires which are passed through the same set-up. The result—costly machine down-time periods are necessary to change rollers. One manufacturer solved this problem by using rollers Flame-Plated with wear-resistant tungsten carbide. Now, machine down-time costs are at a minimum and a better product is produced.

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A DIVISION OF UNION CARBIDE AND CARBON CORPORATION

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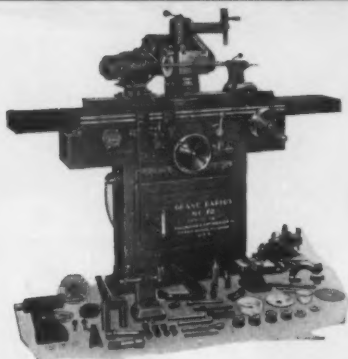
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**Verson now offers standard brakes  
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Any shop where metal is bent can now take advantage of a new convenient way of buying quality all steel press brakes. There's no need for involved proposals or a long wait for delivery. You can now buy Verson No. 16-48 and No. 1062 brakes as easily as buying a car. Prices are published publicly and delivery of standard models is made from *stock*.

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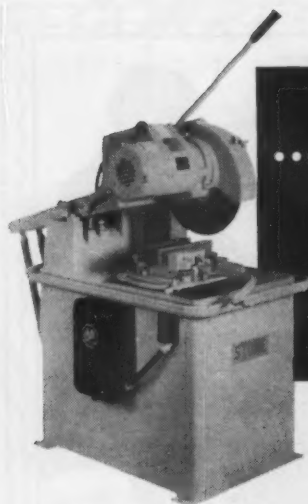


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Model M75 "Heavy Duty" cut-off machine.  
Capacity: 2½" solids, 4" pipe and structurals.

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**BLANCHARD SURFACE GRINDERS** give you peak production and economy when maintenance is performed on schedule, and when you use the best wheel for each job.

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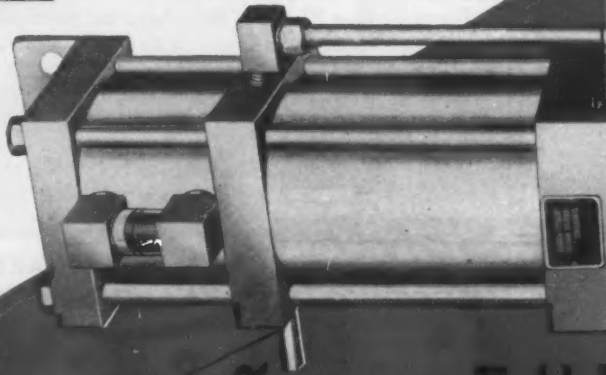
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**80 PSI AIR**

Input Range: 40 to  
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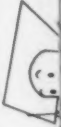
**2000 PSI**

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# FLUID PRESSURE BOOSTERS

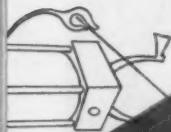
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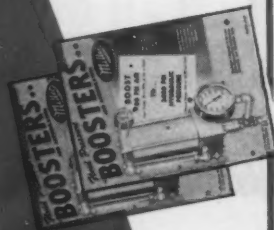
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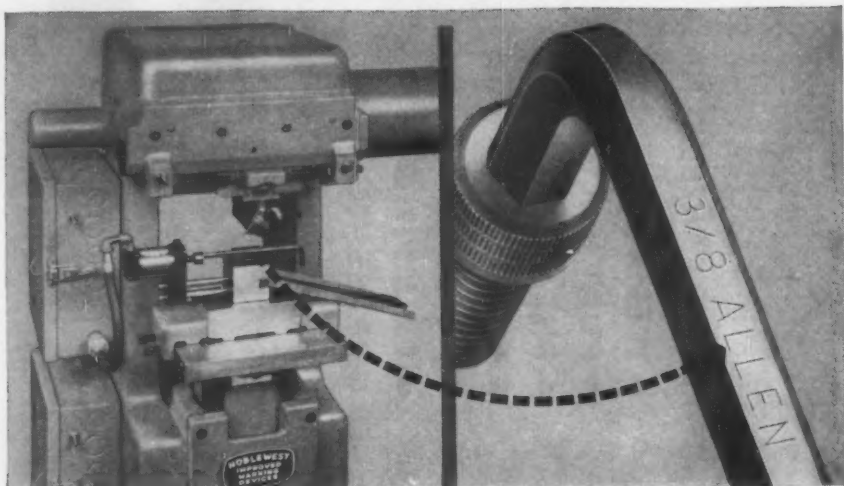
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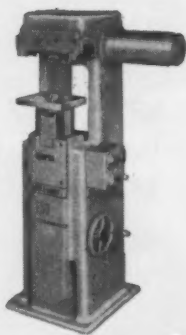
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Roll Marks manufacturer's identification permanently.

## HIGH PRODUCTION MARKING WITH NEW *Cyclomatic* CONTROL

This general purpose marking machine combines the original NOBLEWEST Roll Marking process with CYCLOMATIC CONTROL . . . an exclusive NOBLEWEST electro-pneumatic circuit for completely automatic cycling. When set for automatic operation the machine cycles continuously with no further attention required from the operator. A dual control system also provides for semi-automatic operation or for short production runs. This model can also be equipped with an air ejection system (see above) plus an automatic hopper or dial feed. The basic Model 50P1 features a low price, plus quick delivery! For additional details on how NOBLEWEST Marking Machine, tools and dies can lower your production costs, write the Noble & Westbrook Manufacturing Company, 9 Westbrook Street, East Hartford 8, Conn.




# MARK IT BEST WITH NOBLEWEST

ORIGINATORS OF THE ROLL MARKING PROCESS

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With Permanent  
Magnetic Chuck

## NEW *Vulcan* MOTORIZED ROTARY TABLE for lapping and grinding

(not an index table)

**FASTER**  
circular precision grinding!

Now with this table and with less effort you assure highest standards of accuracy, flatness, finish and close tolerances. At the same time you eliminate slow and complicated tool setups. You cut grinding time greatly by using only cross feed while the table is rotating at infinite speeds between 40 and 100 RPM.



With Lapping Plate


For example, Vulcan's Rotary Table can be used in connection with a sine plate or angle fixture. The dressing of large expensive external wheels for side grinding is therefore eliminated. If you wish we can provide permanent magnetic chucks designed for use with our table, both 6" and 10" in diameter.

Vulcan's Rotary Table is an air operated, self contained unit, portable between bench or machine. A precision center hole for locating and tapped holes in the table for clamping provides easy setup. Circular surface grinder applications are many and varied — grind flanged studs or bushings — bearing spacers — forming rolls — cutters — convex or concave surfaces — punches or dies (radius or angle).

Lapping? Yes — and in micro inches. For the 6" and 10" table, lapping plates of 12" and 16" are provided. Perfect for lapping valve plates, gages, bearing spacers and for carbide lapping using diamond powder. *Write for circular.*

### Major Vulcan Services

Engineering, Processing, Designing and Building . . . Special Tools . . . Dies . . . Special Machines . . . Vulcamatic Transfer Machines . . . Automation . . . including the Vulcan Hydraulics that Form, Pierce, Assemble and size. Vulcanaire Jig Grinders . . . Motorized Rotary Tables . . . Plastic Tooling.



Work clamped to motorized  
table, mounted on sine plate.  
Surface grinder application.

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DAYTON, OHIO

*Now*

for  
economical  
mechanical  
low  
temperature  
refrigeration



**CINCINNATI  
SUB-ZERO  
A-120-1**

- Costs less than  
\$1500.00
- 1 cubic foot capacity
- Simple "plug-in"  
unit

Here's the new Cincinnati Sub-Zero chilling machine engineered to the needs of heat treating laboratories, experimental departments, developmental centers and similar "limited production" users. The Model A-120-1 has the capacity to chill 25 pounds of steel an hour from  $+80^{\circ}$  to  $-120^{\circ}$  F. It is easy to start—just plug it into a wall socket—it costs only pennies a day to operate. Hermetically sealed refrigeration; all-steel construction. Instrumentation as required. Observation window, entrance holes, heaters and other test equipment available as accessories. Other units available in sizes to meet your needs.

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**Cincinnati Sub-Zero Products**

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# VLIER Ready-Made Spring Plungers

Eliminate Costly,  
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Provide accurate,  
pre-set  
end pressures  
for every need!

Why waste workman's time machining make-shift devices to provide necessary spring loads? Standardizing on low-cost ready-made Vlier Spring Plungers speeds jig and fixture manufacture and insures accurate, uniform loading, resulting in more accurate machining, fewer rejected parts!

**40 TYPES AND SIZES!** Hundreds of thousands of Vlier Spring Plungers are now in use positioning parts in dies, jigs, and fixtures, as detents, bearing pins, and die ejectors... wherever accurately-controlled, constant spring pressure is needed! Order a wide assortment of types and sizes from your Vlier distributor today!



## VLIER ENGINEERING

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FORBIDEN THUMB SCREWS • SPRING STOPPERS • SPRING STOPS • SPRING STOPS • SPRING STOPS • SPRING STOPS • SPRING STOPS • SPRING STOPS



**Vlier Screw-Ball Clamps**—Overcome angular irregularities in clamping set-ups. Prevent surface damage. 17 sizes!



**Vlier Key Klips**—Eliminate lost hex keys! Speed positioning of part in fixture. 3 sizes!



**Vlier Torque Thumb Screws**—Apply accurate, controlled end pressures to the workpiece. 4 models; 19 sizes!



**Vlier Spring Stops**—For use where there are no wall sections in fixture. Two models; 14 and 32 lbs. end pressure.

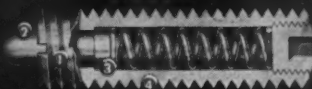


**Vlier Toggle Pads**—Assure clamping of parts with irregular surfaces. 5 sizes; for use with standard screws, toggle clamps and pliers.



**Vlier Fixture Keys**—New 5-Way Key fits all common mill table slots. 3-Way model also available.

- 1 **Plunger end telescopes completely within body!** End pressure is determined with plunger end telescoped 50%.
- 2 **Case-hardened plunger end gives high wear resistance!** Ductile core overcomes brittleness, reduces hazard of failure under impact common with hardened, high-carbon steel.
- 3 **Large bearing surface assures perfect alignment at any part of plunger travel, eliminates binding and reduces wear!**
- 4 **Rust-proof finish prevents freezing in the fixture!**



### 4 Nose Types Available!



**Standard Nose**—Cylindrical plunger end is accurately radiused to speed loading and unloading of jig or fixture. End pressures available from 3 to 42 lbs.; various diameters and lengths.



**Silvernose**—Cadmium-plated plunger ends identify light (1 to 7 lbs.) end pressures. Special spring design developed for fast, repetitive operations, give millions of flexes without fatigue failure!



**Hexnose**—Plunger end is hexagonal-shaped. Can be easily and quickly installed, adjusted, or removed with an ordinary end wrench! End pressures available from 8 to 12 lbs. in Standard type, and from 2 1/2 to 6 lbs. in Silvernose type; various diameters and lengths.



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Write for your complete catalog of VLIER PRODUCTS today! It's free!

# Quick-Change . . .

## Manchester Cut-Off Tool . . .



● New P.D.Q. "Manchester" cut-off tool offers 15 SECOND tool change. Loosen only one screw to change carbide insert. "V" design on support blade and insert makes this tool self-centering and highly accurate. Adjustable rear stop provides positive insert backing and quick adjustment after insert is re-ground.

Tools are available for turret lathes, engine lathes, automatics and cut-off machines... Write for literature and specifications covering ALL the new "Manchester" tool features.

SELF CENTERING



MAJOR LINES OF FORCE



**PORTAGE Double-Quick TOOL CO.**

1037 SWEITZER AVENUE • AKRON 11, OHIO

# Featured IN THIS ISSUE

<b>Interview with Dr. Lillian M. Gilbreth</b> .....	<b>105</b>
<b>Seattle Shop Meets Competition</b> .....	<b>111</b>
<b>Time Study . . . part 8</b> .....	<b>122</b>

**Interview with Dr. Lillian M. Gilbreth**, time and motion study pioneer. Dr. Gilbreth, an outstanding authority on the handicapped worker, answers questions pertaining to this field for the "Leaders of Thought in Industry" article of this issue. Subjects covered include management's attitude to the handicapped, the attitude of the unions, benefits to be gained from hiring the handicapped, special training involved, etc. Page .....105

**Seattle Shop Meets Competition with Multiple Operations**, by Edward R. Lucas. How the Ravenna Metal Products Co. of Seattle depends on multiple operations combined with quality control to keep prices competitive is told in this informative feature article, which should interest readers faced with a similar problem of competition. Time on tapping operation, for example, was reduced from 30 seconds to only 14. Page .....111

**Frozen Mercury Process Investment Castings . . . Case Histories Indicate Machining Savings**, by Irving R. Kramer, vice-president, Mercast Corp., New York, tells of the ability of the frozen mercury process of investment casting to produce parts with exceptionally smooth surfaces and intricate interior sections. Page .....118

**Time Study . . . Part 8** of a continuing series by Harold R. Nissley. This month the author discusses payment for scrap, selling new standards program to a union (case history), and tailor-made low cost job movies. These articles have created an unusual interest in the industry, as evidenced by the flood of correspondence received by this publication since the series began last August. Page .....122

**Pipe-Flange Facing Machine**, by Tom Brown, consulting tool engineer, describes

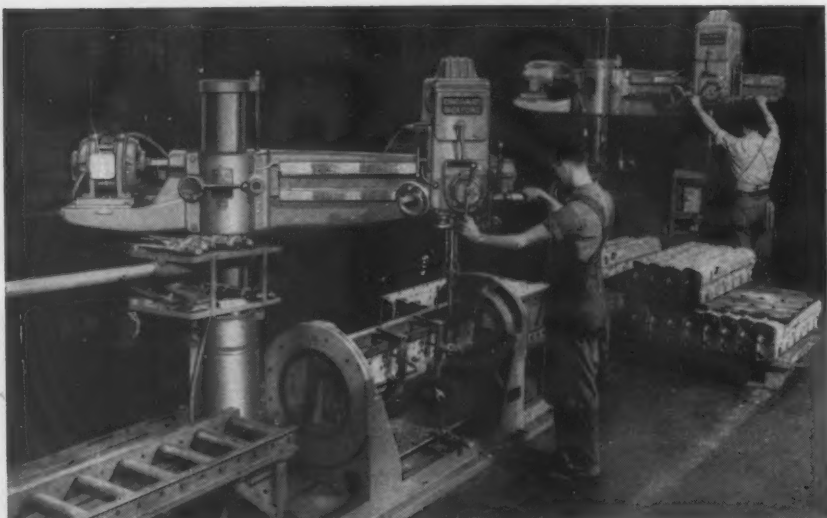
a portable tool designed to face the flange at the end of high-pressure steam pipes which replaces the horizontal boring machine. Fixing tool to the pipe is solved by an expanding mandrel. Facing head is in the form of a disc. Page .....130

**Carbide Straddle Milling Solves Difficult Job** tells how two side milling cutters with solid carbide inserts and a load meter for the mill was the answer to a problem entailing straddle milling of the sides of a rear spar lock fitting for a jet fighter plane. Page .....140

**Many Electronic Components Made by Hydraulic Presses**, by Ben M. Tallierio, supt. machine shop, Ampere Electronic Corp., Hicksville, N.Y., gives a case-history account of how parts of widely varying size and shape are fabricated through the use of light hydraulic presses. Blanking, piercing, forming, drawing and even broaching operations are performed on steel and nonferrous materials. Page .....144

**Messenger Boy, Policeman, or Leader?** As a tie-in with the Gilbreth interview, the Foremanship Forum for this issue is a condensation of a chapter from "The Foreman in Manpower Management," written by Lillian Gilbreth and Alice Rice Cook. The article deals with the foreman's relation to management and the role that managements with varying attitudes expect him to assume in handling his men. Page .....150

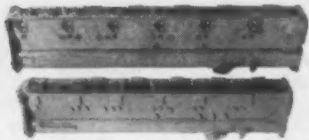
**First Powered Alloy Steel Gears Result of Joint Two-Year Project** reports the findings of three companies who joined together to develop high strength alloy steel gears fabricated by the powdered metal process. This is the first successful application of this process to the production of parts requiring the properties of solid alloy steel. Page .....181



**3 years of operation  
with NO MAJOR  
MAINTENANCE...**



*Photos courtesy Caterpillar Tractor Co., Peoria, Illinois.*



Camshaft Housings for new Caterpillar DW21 Wheel-type Tractor illustrated in insert picture, showing casting before and after drilling operations.

The performance of Cincinnati Bickford Super Service Radial Drills at Caterpillar Tractor Co. has been outstanding, steady and trouble free.

On this job, including drilling, tapping and reaming, 116 holes are produced, 14 are reamed within .0005" tolerance. Caterpillar Tractor Co. also states Cincinnati Bickford Super Service Radial Drills have contributed to the advancement of their product.

Write for Catalog R-21-C.

**80 YEARS OF SERVICE**

..... **CINCINNATI  
BICKFORD**



**RADIAL AND UPRIGHT DRILLING MACHINES**

.....  
**THE CINCINNATI BICKFORD TOOL CO.**

Cincinnati 9, Ohio, U.S.A.



AS THE

# Editor

SEES IT

## Must Be Under 40\*

We are still amazed at many of the help wanted ads which grandly specify that an applicant must be under 40. The implication being that at 40 a man automatically changes from pliant rubber to hard rubber and is of little value. This is a vicious, deadly lie!

"What we need is young ideas and ambition," the employers say. Inasmuch as they are over 40 themselves the statement serves as an admission that they have already petered out mentally and assume that others over 40 are equally as barren and creatively sterile. They dare not admit that others sparkle more after 40 than before; no one likes competition, especially when it threatens a comfortable rut.

"The youngsters have more ideas, they like to take a gamble," they add. So? Really? Do they mean like the following "youngsters" whose lamps blazed brightest after 40: Jefferson, Franklin, Edison, Kettering, Sandburg, Alexander Graham Bell, Twain, Goethe, Beethoven, etc? Studies show the high point in creating is reached at 50. Psychologist George Lawton points out that the mind doesn't stop growing until 60 and then ebbs so imperceptibly that a man of 80 can be as mentally spry as a kid of 30.

As for youngsters taking a gamble—neither production nor business is a

gamble; a calculated risk, yes, and so we hope no one minds if we take the risk with a man who knows what it's all about.

We have met hundreds of production executives and the best were well over 40, mature and seasoned. We have yet to meet more than an occasional youngster who filled big shoes: golden promise, ability and star dust, yes, but the calm maturity, not yet. Many men under 40 glitter like frosty winter stars. While we are mindful of them we submit that thousands of stars are over 40 for every youthful twinkler. Remember, when hiring men you're really hiring creative ideas. You're groping for steady lights that don't flicker but burn briskly on knowledge, experience and ideas.

It may be interesting to know how the vicious 40-year line was drawn and by whom. An unknown physician and professor said, "If you haven't cut your name on the door of fame by the time you reach 40, you might as well put up your jackknife." The same professor was of no national fame until he wrote "The Autocrat of the Breakfast Table," when he was nearing 50. His name? Oliver Wendell Holmes, who reached the height of his creative life at the age of 75 when he wrote his biography of Ralph Waldo Emerson!

\*Reprinted by request.

*William F. Schlicher*



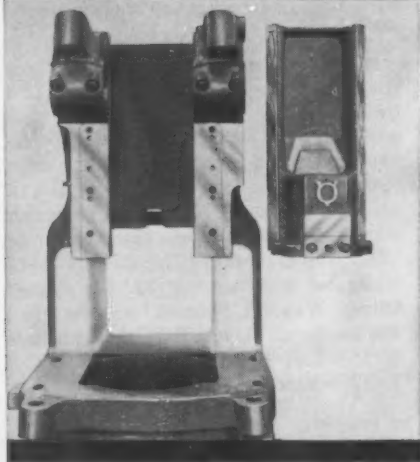
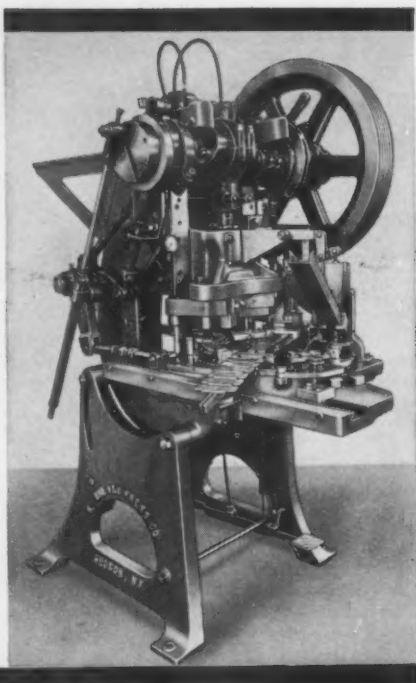
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## **Letters to the Editor**

### **Sub-Zero Chilling of Metals**

That was a splendid article in your January issue, *Below Zero Chilling Toughens Metals, Increases Tool Life*, by Victor Morris. Articles of this nature make your **BLUE BOOK** the most sought after in my shop. Unfortunately, no source of supply was given for the chilling machines. Isn't there a company in Cincinnati that specializes in this type of work?

*Jackson R. Van Greiden  
Battle Creek, Mich.*

*Material for the chilling article was furnished by Cincinnati Sub-Zero Products, 3930 Reading Rd., Cincinnati 29, O. Any information on this process may be had from this company who has done considerable research in the field of chilling.*

### **Time Study**

I have just read the second of Mr. Harold R. Nissley's articles on time study which you have published in the *Machine and Tool Blue Book*. I found the article extremely interesting, very complete and written in a manner that provides for good understanding.

I would like to use this article (as well as the other articles of the series) as reference material for a departmental training program which I am developing.

In this respect, I would very much appreciate obtaining reprints or tear sheet copies of the entire series of articles on time study written by Mr. Nissley.

*H. Stanley Barr  
Industrial Engineering Dept.  
Crown & Closure Div.  
The Crown Cork and Seal Co.*

I would like to take this time to thank you for the very interesting booklets on time studies. These were sent to Mr. O. F. Beyers of our company and passed on to me.

They are very interesting and have a lot of pertinent information condensed into a small package.

If you would please thank the many people who had their finger in this pie I would appreciate it because it is very simply written and is very good for training purposes.

*F. C. Noack  
A. W. Cash Valve Mfg. Corp.*

The recent article "Arbitrating Work Standards" written by H. R. Nissley which appeared in the January issue of *Machine & Tool Blue Book* has caught my interest. I believe I have never read a finer article on incentive systems.

I would appreciate it if you would send me the complete set of Mr. Nissley's articles (part 1 to 5).

*Theodore C. Metros, Standards  
Cole-Hersee Co.*

# NOTCH SHEET MATERIALS



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314 8th Ave., Lake City, Minn.



The last few remaining reprints have been sent.

Demand for reprints was so heavy that they are now completely exhausted. The entire series will be reprinted within the next few months. This will include not only the articles in the present Time Study series, but also material published several years ago and brought up to date by Mr. Nissley.

#### 1955 Directory

Your 1955 Machine and Tool Directory arrived about a week ago . . . in excellent condition. It was easy to see the great care used by your staff and your advertisers to make this a "desk piece" of permanent reference.

P. H. Wilmarth, Plant Eng.  
The Blanchard Machine Co.

The arrival of the 1955 Hitchcock's Machine and Tool Directory was very timely. At the present time we are engaged in developing and studying equipment and processes for new manufacturing facilities. The directory, with its excellent coverage of sources of supply and technical information, will certainly be a time saver.

J. J. Johnescu  
DH Plant Facilities  
Westinghouse Electric Corp.

We wish to acknowledge the receipt of your 1955 Machine & Tool Directory. We have a group of fifteen people in the Tool Design who use this book quite regularly to establish sources of the various items that are advertised.

G. D. Schiltz, Tool Planning  
The Hoover Co.

We have received your copy of the 1955 Machine and Tool Directory and want to comment on the wealth of beneficial information it contains.

Otto Jendresen, Senior Eng.  
The Parker Pen Co.

. . . Frankly it is a little difficult to put into words the value of this book. This is the first book of this kind that I have ever seen. Whoever conceived the idea deserves a lot of credit.

Earl L. Walker  
Eastern Sales Dept.  
Marshall Steel Co.

. . . We find this directory to be one of our most helpful reference books and we used the 1954 issue to very good advantage.

C. L. Larraben, Asst. Supt.  
Int. Business Machines Corp.

#### Cutting Forces

Please send me tear sheets on Frommelt's article in October, 1954, issue of Machine and Tool Blue Book entitled "Understanding Cutting Forces for Better Machining." These articles are valuable to me in my teaching work.

N. F. Snyder, Head Tool Eng.  
Section, Ind. Eng. Dept.  
General Motors Institute

. . . and was very interested to read the article "Understand Cutting Forces for Better Machining Practice" by H. A. Frommelt.

I would appreciate receiving a reprint of this and any other similar articles written by Mr. Frommelt.

J. R. Ball, Senior Processor  
Time Standards Department  
Dominion Engineering Wks., Ltd.

We would greatly appreciate two reprints or tear sheets of the following two part article appearing in the October and November issues. . . "Understand Cutting Forces for Better Machining Practice," by Horace A. Frommelt.

John S. French, Librarian  
A C F Industries, Inc.

Tear sheets sent.

#### Plastic Tooling

We would greatly appreciate receiving six reprints of the article "A Diemaker Looks at Plastic Tooling" by Bert Jones, Superintendent, Vulcan Tool Company, Dayton, Ohio, which appeared on page 117 of the MACHINE and TOOL BLUE BOOK.

George E. Hendy  
Director of Sales & Engineering  
Tyleno Plastics, Inc.

Tear sheets sent.



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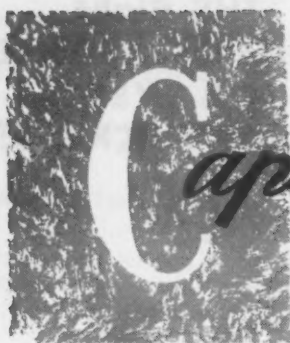
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# Capital Roundup

by Arnold Kruckman

Blue Book Washington Correspondent

WASHINGTON . . . The conference of the machine tool manufacturers, Jan. 28, sponsored by the Metalworking Equipment Div. of the Business and Defense Services Administration, Dept. of Commerce, was the scene of much discussion of problems which vitally affect the machine tool industry.

## Government-Industry Co-operation

The purpose of the Department series of industry conferences is to obtain the viewpoint of business on the many problems of joint Government-industry interest. Those present stressed that maintenance of the domestic machine tool industry in a healthy and aggressive condition, so that it can meet the demands of any future emergency, is a pressing problem requiring urgent Government-industry co-operation.

An industry spokesman declared that, due to the strategic importance of machine tools to national defense, *the industry should be given now a blanket initial draft deferment and top priority to prevent bottlenecks that delayed production in past emergencies.*

## Off-The-Record Discussions

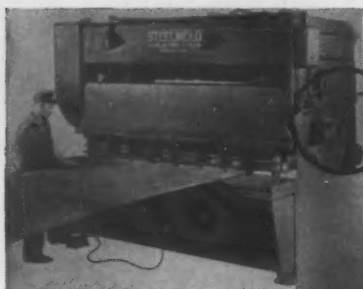
- *DOD to purchase machine tools totaling \$100 million*
- *Probably over 240 elephant tools available*
- *Leasing charge increase wanted*

It was stated by an industry conferee that if all the needed material for producing machine tools is funneled into the industry at the outset of an emergency, production of military end items could be stepped up over night. By contrast, it was pointed out, *the industry in one emergency received less material than the toy industry, and its essentiality in that respect was not recognized until eight months after the outbreak of the emergency.*

## Prevention of Production Delay

Another representative of the industry strongly urged that the Govern-





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ment draft detailed plans for pool orders, and place them in the hands of machine tool manufacturers so that they could start production without undue delay in event of a sudden emergency mobilization demand for tools.

### **Machine Tool Leasing**

Leasing of Government-owned machine tools for non-defense production was the subject of considerable discussion in the Conference. Industry members expressed *general approval of effort by the Department of Commerce and the Department of Defense to eliminate Government competition with private business.*

Industry spokesmen stressed that in their opinion *it is unfair to provide competitive advantage for one company over others through leasing of Government-owned tools for non-defense production.*

A representative of the Office of Defense Mobilization asserted that leasing of machine tools by the Government is being held to a minimum. He pointed out that each case of leasing for non-defense production is carefully considered, and based upon BDSA recommendations; and that only a few cases have been approved to date.

### **DOD Custody of Machine Tools**

The conferees were advised by an official of the Department of Defense that *specific progress is being made to establish and maintain a current inventory of machine tools under DOD custody.* Reviews are being made with the assistance of industry representatives to eliminate from the reserve all tools that are not required for current and anticipated mobilization requirements.

### **Production Capacity**

Discussing the capacity of the American machine tool industry to produce items required by changing technology, a representative of ODM's Advisory Committee on Components and Production Equipment said there is a need to devise a more fluid plan, and to develop more versatile tools for equipping defense-supporting facilities. He added that it is necessary to examine and modify the industrial reserves in order to obtain its maximum effectiveness.

### **Foreign Imports**

Industry spokesmen stated that the job of maintaining the machine tool business on a sound footing is complicated by its *inability to meet competition from imported items* built in low-wage countries. They also expressed satisfaction with recent improvements in depreciation allowances, but suggested several areas in which they felt the Department of Commerce and BDSA could be definitely helpful in interpreting renegotiation problems to responsible governmental agencies on behalf of the industry.

### **Conference Participants**

Those in attendance at the Conference were Ralph R. Baldenhofer, the Thompson Grinder Co., Springfield, O.; Richard W. Banfield, Pratt and Whitney, Div., Niles-Bement-Pond Co., West Hartford, Conn.; Tell Berna, National Machine Tool Builders' Assn., Cleveland, Ohio; Frederick S. Blackall, Jr., The Taft-Peirce Mfg. Co., Woonsocket, R.I.; Alfred V. Bodine, The Bodine Corp., Bridgeport, Conn.; Norton A. Booz, Federal Machinery Sales Co., Chicago; Fred L. Chapman,

Gisholt Machine Co., Madison, Wis.; Ralph E. Cross, The Cross Co., Detroit, Mich.; Charles S. Davis, Jr., Lake Erie Engineering Corp., Buffalo, N.Y.

Also, Frank U. Hayes, The Bullard Co., Bridgeport, Conn.; Everett M. Hicks, Norton Co., Worcester, Mass.; M. A. Hollengreen, Landis Tool Co., Waynesboro, Pa.; James C. Kelley, American Machine Tool Distributors' Assn., Philadelphia; Ralph J. Kraut, Giddings & Lewis Machine Tool Co., Fond du Lac, Wis.; Richard E. LeBlond, The R. K. LeBlond Machine Tool Co., Cincinnati; Perrin G. March, III, The Cincinnati Shaper Co., Cincinnati; August Marx, The G. A. Gray Co., Cincinnati; Allen C. Mattison, Mattison Machine Works, Rockford, Ill.; J. Herbert Myers, The Lodge and Shipley Co., Cincinnati; Harold Goldstein, Kings County Machinery Exchange, Brooklyn, N.Y.

Likewise, Louis Polk, The Sheffield Corp., Dayton, O.; Jerome A. Raterman, The Monarch Machine Tool Co., Sidney, O.; Henry D. Sharpe, Jr., Brown and Sharpe Manufacturing Co., Providence, R.I.; Charles W. Stewart, Machinery and Allied Products Institute, Washington, D.C.; Walter W. Tangeman, The Cincinnati Milling Machine Co., Cincinnati; Francis J. Trecker, Kearney and Trecker Corp., Milwaukee; Ray A. Vidinghoff, Machinery Associates, Inc., Wynnewood, Pa.; Randolph K. Vinson, Machinery Dealers' National Assn., Washington, D.C.

BDSA Administrator Charles F. Honeywell presided at the Conference with Graham E. Marx, Director Metalworking Equipment Division, as co-chairman.

Off-the-record discussions revealed that our capacity for elephant tools, in the opinion of the members of the industry, seems great enough. There was some discussion as to how many tools we now have ready for use. A survey was made recently among the large civilian plants that have used the elephant tools and it was determined that there probably are 240 unclaimed collectively in the several plants. A survey is under way by the BDSA; at its conclusion the Agency will determine the number of elephant tools really available.

### **Leasing for Defense**

There was also discussion about leasing for defense. One got the idea that there was a considerable dissatisfaction with the leasing charge which is said to run from 1% per month up to 20% per year. It seemed to be the informal opinion that the charge should be increased to 2% per month, particularly for leasing of tools for non-defense.

### **Government, Industry at Variance**

There was some discussion about amortization and about surplus and about keeping tools in storage and about transferring them for various purposes. However, the ideas on the part of the members of the industry and the members of the Government agencies seem to be at such variance that determination was not clear. It will probably be a little while before this debatable question is made clear to the satisfaction of the majority.

### **Machine Tool Orders Down**

It came out in informal discussion that the U. S. Senate Committee on

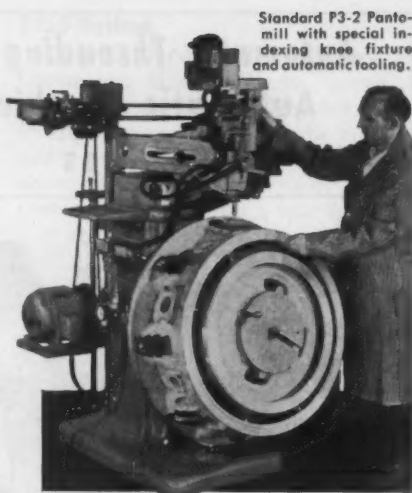
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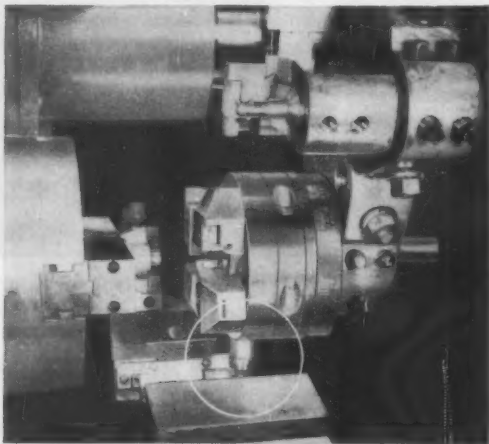
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In addition, this head through the use of long life tangential chasers offers lower tool cost and less down time. For example—when threading the workpiece shown, a contact ferrule of 85-5-5-5 cast red brass requiring a  $1\frac{1}{4}$ "—16 pitch UN thread  $\frac{3}{4}$ " long into a  $\frac{1}{16}$ " relief, complete runs of over 3,000 pieces are made without grinding the chasers. The 2" Head, shown here, will normally thread all diameters from  $\frac{3}{8}$ " to 2", with oversize capacity up to  $3\frac{3}{4}$ ". For more information, ask for Bulletin F-90.

389

**LANDIS Machine CO.** WAYNESBORO  
PENNSYLVANIA

Small Business has made a formal estimate that new machine tool orders are the lowest since May, 1950. The Committee and some members of the industry are puzzled over the more than seasonal drop in orders, with only \$35 million for the month compared with \$44 million for both October and November of 1953. *"Business is supposed to be picking up, the new tax laws are a little better, and we are selling harder than we have in five years—but apparently no one's buying."* This was an expression by a particularly outspoken member of the industry. New order estimates for all of 1954 run about \$535 million, a decline of 38% from 1953. Shipments are expected to be about \$862 million for 1954, a drop of 25% from 1953's volume.

#### **Government Purchases of Machine Tools**

From the same source at the same time came the word that the Department of Defense with funds made available by the last Congress for fiscal 1955 will purchase *\$100 million worth of machine tools*. They told us the funds will be used almost entirely for the procurement of long production lead time machine tools for mobilization reserve.

#### **Phantom Orders**

In another mobilization move, defense officials started to blueprint "phantom orders" for goods needed in a mobilization period. Thousands of manufacturers will be earmarked, at least in theory, as potential prime and subcontractors. Some *experimental contracts will be let* to help producers of war items maintain cadres of skilled workers and engineers in stand-by status.

#### **1955 Outlook**

Early in January the Secretary of Commerce, Sinclair Weeks, issued a report on industries' outlook for 1955. In this personal statement he emphasized that machine tools had ahead substantial *reduction in new orders* now as compared with a year ago; and that this condition indicates machine tool shipments for 1955 will drop to about \$600 million as compared with the approximately \$900 million worth shipped in 1954; however, *Government orders, which appear imminent, may boost this figure substantially*. The National Machine Tool Show in September, the first since 1947, *should convince many* that it is essential to replace obsolete equipment; but these orders would not be reflected in the shipment total until 1956.

#### **Pentagon's Procurement Policy**

At the various gatherings here recently there also was much discussion about the enquiry pressed by Senator Edward J. Thye on the Pentagon's procurement policy. He has insisted that the Pentagon people should tell him whether the directive they have issued will restrict potential suppliers to a list of approved firms which conceivably might receive the bulk of defense contracts on the virtually non-competitive basis.

#### **Defense Problems of Small Companies**

He raises the question how small companies can *qualify as "essential suppliers?"* He wants to know why the Small Business Administration was not consulted in formulating a directive? And he asks *what subcontracting opportunities will small firms have* under the Pentagon program in view of the adoption of the "weapons compo-

ment" system of procurement by which the prime contractor must supply items fully equipped with components, many of which were formerly purchased by the Government? The Senator seems to think that the negotiation of contracts with a limited number of suppliers will inevitably result in higher prices to the Government.

### Foreign Trade

Saigon, and other French possessions, are purchasing from us, in considerable haste, machine tools in the sum of \$200,000. Foreign Operations Administration announces "because of the urgency of this procurement no further details of the proposed purchases will be available."

### Tariff Program Protest

The Service Tools Institute of New York has mailed every Member of Congress a letter showing that the importation of hand tools is doing considerable damage to American manufacturers of wrenches, pliers, chisels, punches, screw drivers, hammers, metal cutting snips and shears and other hand tools. One firm, widely known, is selling a ten inch adjustable pipe wrench, similar to the domestic Stillson, at 88c, which it costs the American manufacturer an average of \$2.25

to produce. Here in Washington they took a company of Congressmen to a store on Pennsylvania Avenue which was selling six different kinds of imported magnetized screw drivers for 77c, plus 2c sales tax. The American production comparable in quality had to sell for \$3 to \$4. Paul Peters, the fiscal detective, showed Congress that wages per hour in the tool industry by country is thus:

U. S. of America	.....\$1.85
Sweden	..... .67
United Kingdom	..... .58
Netherlands	..... .38
Belgium	..... .48
Germany	..... .44
Japan	..... .19

### Foreign Market Advertising

The International Advertising Association is responsible for the statement to Congress that U. S. international business has invested approximately \$300 million in advertising and promotion of products in foreign markets. Over \$100 million is spent annually by the United States in overseas newspapers, and roughly \$25 million in foreign magazines and trade journals. More than \$50 million is spent in U. S. international commercial radio and television programs.

## New Officer Introduced to Equipment Division

The staff of the Metalworking Equipment Division of the BDSA held a rally the evening of Jan. 27 at the Carlton Hotel in Washington to introduce Mr. and Mrs. Ralph R. Baldenhofer of the Thompson Grinder Co., Springfield, O. Mr. Baldenhofer is the Division's new head. He succeeds Graham E. Marx, from the G. A. Gray Co., Cincinnati. O. Length of term

of office is six months. Administrator Charles Honeywell presented Mr. Marx with one of the flags that fly over the Nation's Capitol. It is an unusual distinction to receive one of these banners, which are changed every 24 hours. Flags were also presented to Ralph E. Cross of the Cross Co., Detroit, and to A. H. Holley.

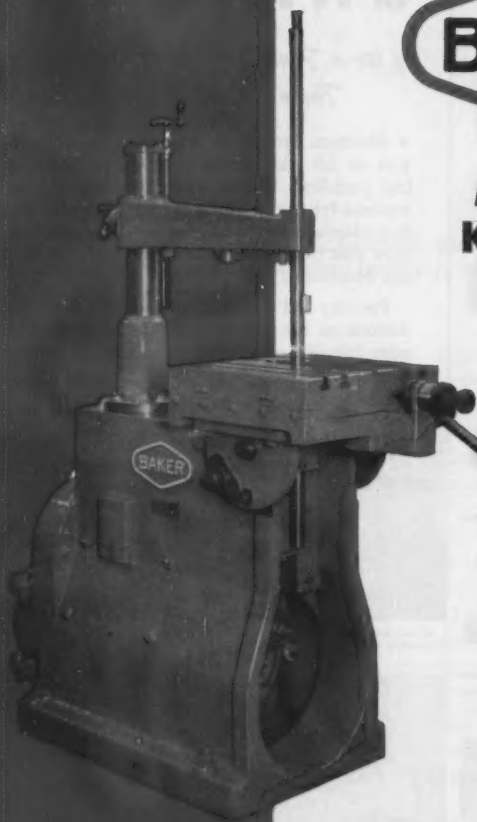


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Vertical Spindle  
Disc Grinders

Piano Grinders,  
Rotary Table Type

Rotary Table  
Surface Grinders

Automatic Rotary  
Surface Grinders

Reciprocating Table  
Face Grinders

Disc Grinders,  
Single Spindle Type

Reciprocating Table  
Surface Grinders  
Vertical Spindle

Face Grinders,  
Traveling Wheel

Piano Grinders

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40 hours before — now 4 hours: Pump cast ground on Mattison Horizontal Spindle Precision Surface Grinder



120 surfaces of cast iron compression heads per hour, removing 1/32" stock with Mattison No. 24 Rotary Surface Grinder



900 connecting rods per hour, using 40 station fixture to finish grind crank and axial pin end of assembled rod with Mattison No. 72 Grinder



Shaves variety of work run on Mattison Face Grinders

**MACHINE WORKS**

# L *eaders* of Thought in Industry

**An interview with Dr. Lillian M. Gilbreth, pioneer in time and motion study, and outstanding authority on the handicapped and their problems.**

*Q. Dr. Gilbreth, how long have you been interested in the handicapped workers and their problems?*

A. I've been interested in this subject since my marriage. My husband, Frank, became very much interested, especially as it pertained to the construction industry. When he first developed his ideas of time and motion study he realized its full implications. He said it was just the thing for the handicapped.

*Q. Then time and motion study did much to pave the way for a scientific introduction to methods of employing them?*

A. Yes. By reducing certain jobs to basic motions it was discovered that a person need not have full use of his hands, legs, or eyes to perform a set of specified work motions. You might say, without the help of time and motion study scientific work with the handicapped might have been delayed for many years.

Frank's work took on a greater urgency after the first World War when it became evident that society had a responsibility toward the unfortunates who were suddenly denied their profession because of a disability suffered during the war. At that time Frank even designed and constructed simple attachments to help them perform work.

*Q. I suppose these attachments were based on his immediate observations regarding motion study?*

A. That's quite true. When he reduced a job to its simplest terms he would frequently discover that a handicapped person could perform the work. He would then design an attachment enabling the person to do the job.

*Q. Is there any reluctance on the part of management to hire handicapped people today?*

A. I shouldn't say 'reluctance'; rather, they haven't gotten into the problem. They just haven't thought enough

about it. Some manufacturers also feel it's a form of charity, which is wrong of course; some feel there is a product deterrent when produced by handicapped people. For example, in one city the products of the blinded were for sale. Unfortunately, the merchandise didn't move. The color of the product played an important part in the lagging sales even though the products were of high quality. Advertising and merchandising people were called in and the merchandise was made to move. Subsequently, the merchandising and advertising people worked with the blinded, introduced different colors and designs and eliminated the problem.

Specialists must be called on for help. In other industries other types of specialists must be asked to help, whether it be time and motion study men, specialists in prosthetic devices, advertising or sales, but work with the handicapped presents a challenge to many individuals if their problems are to be solved.

*Q. Do you think management is aware of the benefits to be gained from hiring handicapped?*

A. I think industry finds their employment rewarding. Handicapped are eager to learn and to improve. They are loyal in the extreme and possess a high morale. They do not present a discipline problem, have a negligible turnover and give their fullest to the company which employs them. Their contribution can be enormous.

*Q. Is there a severe training problem?*

A. Sometimes there is, at other times none at all. We must remember that handicapped people are no different, mentally and emotionally, than they were before their misfortune.

Care must be taken to analyze their previous jobs and try to fit them into what they used to do, or at least place them in similar work.

Industry must take time for additional testing; that is, are the prospective handicapped employees accident prone? are they special risks? what were they before they became handicapped?

*Q. It must be important that the job is in line with their capabilities, and not that they be fitted to the job?*

A. Fundamentally that is correct. It would certainly be easier to adapt a



Dr. Lillian M. Gilbreth

Last April Dr. Gilbreth became the first woman ever to receive the coveted "Washington Award," the engineering profession's highest honor. She earned it for her outstanding work in the field of the handicapped.

The life story of Mrs. Gilbreth and her husband, pioneer time study engineer Frank Bunker Gilbreth, is interesting enough to have been made the subject of two best sellers, "Cheaper by the Dozen," and "Belles on Their Toes." Space here prevents an elaboration of Dr. Gilbreth's almost unbelievable accomplishments, but a partial list of her positions, degrees and honors, as given in "Who's Who in America," 1954-55, will convince even the most skeptical that she has established herself as one of the leading women in the industrial world: B. Litt, U. of Calif., 1900; M. Litt, 1902; LL.D., 1933; Ph. D., Brown, 1915; Sc. D., 1931; M. Engring., U. of Mich., 1928; Dr. Engring., Rutgers Coll., 1929; Stevens Inst. Tech., 1950, Syracuse U., 1952; Sc. D., Russell Sage Coll., 1931, Colby Coll., 1951, Lafayette Coll., 1952; Dr. Humane Letters, Temple U., 1949. President of Gilbreth, Inc.,

Construction Engineers in Management; director courses in motion study and in the utilization of technological progress; prof. management, Purdue U., 1935-48; conducted courses for the disabled since 1948; chairman dept. of personnel relations, Newark Coll. Engrng., 1841-43.

Author: "Psychology of Management," 1912; also with husband, "Time Study," "Fatigue Study," 1916; "Applied Motion Study," 1917; "Motion Study for the Handicapped," 1919; "The Home Maker and Her Job," 1927; "Living with our Children," 1928 (with Edna Yost); "Normal Lives for the Disabled" (with Alice Rice Cook), 1944; "The Foreman and Manpower Management" (with Alice Rice Cook), 1947; "Living with our Children," 1951; also papers on education, management, psychology, and research; contributed chapter, "Work and Leisure," in "Toward Civilization" (edited by Charles A. Beard); article on Scientific Management in New International Encyclopedia.

worker in a wheelchair to a bench operation such as assembly than to adapt him to the running of a machine which requires loading and unloading. The job and the employee must be matched within the general area of the employee's previous work, wherever possible.

*Q. Do any of the handicapped have special aptitude for certain work because of their disability?*

A. Yes. A person with a prosthetic device on his arm, or what you might call a mechanical hand, can handle hot objects with ease. A deaf worker is suited for working in a particularly noisy environment. Incidentally, blind workers make good inspectors, especially where the sense of feel is needed. A number of manufacturers have developed, for their own use, gaging devices with a bell instead of a light to determine whether a part will pass or not. But these are individual cases and each manufacturer with a little imagination can develop his own devices and work areas.

*Q. Are we making advances in supplying the handicapped with hands, legs, arms, etc?*

A. We are indeed. At one time the Europeans were ahead of us in manufacturing prosthetic devices. They were beautiful instruments with which one

could do almost anything; however, they were complicated and when one really went to work they all too frequently landed in the repair shop.

The most important aspect of a device is its flexibility. It must be designed to be useful in many different areas yet be uncomplicated enough for long and hard service.

Years ago we reproduced hands, legs, arms, etc. in such a manner that they resembled the original as closely as possible, without worrying too much about the work function. Consequently, we had beautiful legs and beautiful hands, complicated and in many instances not at all suited for work. The current trend is to emphasize the versatility of the member so that it can be adapted to useful work forgetting, if necessary, the looks of the device.

*Q. Is industry helping in the development of mechanical devices?*

A. Industry must help the manufacturer of prosthetic devices as much as possible. He must tell him the kinds of work which the handicapped can perform and even go so far as to design devices which the prosthetic manufacturer can produce. Industry must tell the manufacturer how they should be made.

However, an important phase of the subject begins at the stage of the

original amputation. Surgeons must appreciate the problems in industry so that they can perform their operations more understandingly. Surgeons should understand more fully what prosthetic devices can do and how they are used in industry. For instance: why amputate at one point when by going 1" down it will be made possible for the amputee to use his attachment better, or even use a more efficient type of device.

Surgeons are working much closer with the manufacturers of devices to bring this about. We must tie in medicine with industry. There is much to be done in this field; there must be greater cooperation between the various, and seemingly unrelated, professions of medicine and industry.

*Q. What is the union attitude toward the employment of handicapped people?*

A. They are very co-operative. They encourage the study of the problem and encourage the adoption of the solution. I think recent films, books and articles on the subject of disabled people have made an impression and focused attention of industry on the subject. More and more is being done. After all, a handicapped person is exactly like everyone else, he merely has a few more things.

*Q. Much has been done to make workers more efficient. Has anything been done to increase an executive's efficiency?*

A. Executives are different. They're difficult to work with due to the nature

of their work.

There is considerable psychology involved here. An executive is supposed to be efficient to begin with; every executive thinks he is. If he needs help he has but to push a button and help is at his elbow.

An executive's efficiency may be improved were he to delegate his work and merely check progress reports. Too many executives want to do all the work themselves; they have a fear of delegation.

*Q. Some psychologist asserted recently that work should be done in small doses, that is, do one job for a period of time, then pick up another and work on that and finally, return to the original job. It is claimed that fatigue is lessened.*

A. I think that is an unsafe assumption. Everyone works differently. What is good for one may not be the best for the next person. Frank was a concentrator. He'd work day and night on one problem until he solved it. I, on the other hand, hop around and do work in small pieces. Everything depends on the individual.

*Q. What do you think of automation and the push button factory?*

A. It could be a wonderful thing. It would give workers more time to enjoy life. Maybe it would be more monotonous, but nobody should mind that too much if they have more time and freedom as a result of it.

### **The Handicapped in the Home**

*Dr. Gilbreth:* I think there is a big field for adapting systems to the home.

We are too prone to think of the handicapped only as people without arms or legs.

We forget that people with heart trouble or other impairments, although not as dramatically evident as amputees, also need considerable help. As can be imagined, when any member of a family is disabled, even partially, an additional strain is placed on the entire family and adjustments must be made by everyone.

The New York Heart Center sponsored an exhibit some time ago. A number of physiologists, engineers and other specialists contributed of their time and talents to discovering how women with heart conditions could perform their household duties in spite of their handicaps. The importance of the studies conducted at that time, coupled with exhibits, lay in this: that manufacturers of kitchen appliances could design their products to ease working conditions; also that step-saving ideas could be introduced, as well as methods to aid in reducing motions to

bare essentials. There is no reason why women with heart conditions cannot perform as efficiently as those without an impairment.

The work of architects and builders in designing and building step-saver kitchens has been a boon for women with heart conditions.

Dr. Howard Rusk of Bellevue Hospital has done a great deal of work with women in wheel chairs. There are a great many problems attending this. For example, to enable women in wheel chairs to work at a sink requires a special type of sink so that the chair can come close enough to the work area; it requires a special kind of faucet which can be operated from a distance; it requires a certain kind of sink stopper, again one which can be operated from several feet away.

Professional people, hospitals and universities are all working on this problem.

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## Seattle Shop Meets Competition With Multiple Operations

By Edward R. Lucas

Seattle, Washington

MULTIPLE operations combined with quality control, are essential elements of the successful shop operation formula developed by Ravenna Metal Products Co. of Seattle, Wash. The shop divides its production between manufacture of its patented faucets and valves, and jobbing work. The ratio now is about 60% manufacture of its Moen brand faucets, and 40% jobbing. The latter is mostly done as sub-contractor on small parts work to Boeing Aircraft Company of Seattle.

"If we could not double up on some of these operations we'd have to price our Moen single handle mixing faucets and valves right out of the market," explains shop superintendent Kirk Schlamp. "Our faucets would have to retail at twice their present price range. Multiple operations also make it possible to sub-contract small parts production work profitably."

A new system of quality control was put into operation in the shop about two years ago, when the firm hired an

- *without multiple operations this company could not compete*
- *milling of slots reduced with special fixture*
- *on tapping operation time was reduced from 30 to 14 seconds*
- *remodeled pre World War I turret lathe performs 10 operations in 65 seconds*
- *inspection has paid off in complete standardization*

inspector and set up definite checking procedures on all shop work.

The Moen faucet introduced several revolutionary principles of faucet design. Its single handle controls both water volume and temperature by easy finger-tip manipulation. Internally, the flow is controlled by a stainless steel valve instead of by a bib washer. Faucets and valves are made for sinks and lavatories, and for tub and shower



Last operation is grinding of I.D. on No. 5 Bryant internal grinder. Mechanic here is checking completed part with plug gage.

installations. The product is distributed nationally, and is used in General Electric and Hotpoint automatic dishwashers and in Bastion-Blessing commercial sinks.

Including all models, there are some 600 parts to manufacture. For one faucet, about 30 parts are required. However, all working parts are identical and interchangeable for all faucets, including the very first units to be manufactured. The Moen faucet is in the "deluxe" fixture category, with models retailing for \$18 to \$30.

A central part of the Moen valve and the part requiring the closest dimensional control, is the valve sleeve. This is made of 416 stainless annealed steel heat treated before machining. Most critical dimensions are the ground O.D.

and I.D. Milling the two slots which control the water flow in the valve, also presented a problem in fast production.

Machining is done on a Warner-Swasey, where the O.D. is turned and the hole is drilled, bored, and reamed. The slots are milled, and the O.D. is then ground to its finished dimension of .9860 plus .0005 minus .0000 and the I.D. to .6155 plus .0002 and minus .0000. A concentricity tolerance of .0002 must be maintained between the O.D. and the I.D. Diameter of the outside is checked by visual comparator; a carbide plug gage is used to check the I.D.

As first set up, the job routine did not require maintenance of any concentricity tolerance on machining. This required three grinding operations, the first being to set the part up on centers and grind the O.D. just enough to true it up with the I.D. The O.D. was then ground to size on the centerless grinder. The I.D. was finished on the shop's No. 5 Bryant internal grinder, which also controlled the concen-

Slots in valve sleeve are milled 28 at a time using a special holding fixture. Mechanic here is removing completed parts while machine is taking cut on the 14 parts held in the other half of the holding fixture.



One of shop's multiple operation set-ups on the brass body nut for faucet. Operation drills 4 holes, mills 4 flats on part in 13½ seconds. End milling cutters come in from sides, part is fed into the drill.



tricity tolerance of .0002 inch, figure 1.

Greater efficiency has since been achieved by setting up the machine operation so that a concentricity tolerance of .001 is held. The first grinding operation on centers to true the O.D. with the I.D. has thus been eliminated, the sequence of the two other grinding operations remaining the same. The O.D. is ground on a Cincinnati No. 2 centerless grinder.

Time in milling the slots has been reduced by use of a fixture which holds 28 sleeves. The work is done on a Kempsmith milling machine set at 98 R.P.M. and a feed of 3 inches per minute. Double cutters mill sleeves on both sides of the fixture simultaneously. The width of the slot is 3/16 plus or minus .010 with a locating tolerance of plus or minus .003, figure 2.

The original procedure here was to mill all parts on one side, then turn

the fixture to mill them on the other. The machine was then stopped while the parts were taken off and new ones put on with a speed wrench.

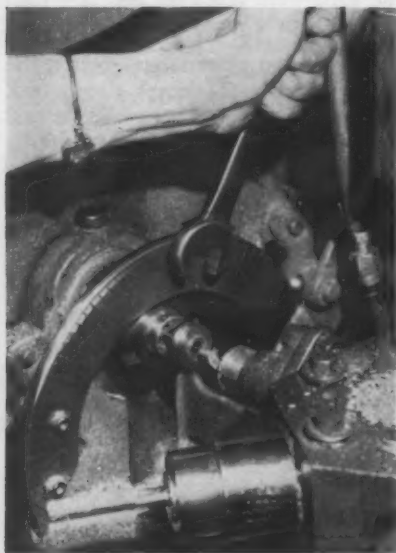
The current procedure is to start the cut with only 7 sleeves mounted, mounting 7 more sleeves while the first cut is being made. The fixture is turned over as required in order to mount the next 7 parts, and so on until the fixture is fully loaded. By the time the fourth cut has been taken the first 7 parts have been completed. While the fifth cut is being made, these parts are taken off by speed wrench and new ones put on. In this way, parts are always changed while the machine is working. The revised routine has enabled the shop to reduce the time for cutting both slots to 30 seconds per part.

Time has been saved in machining some parts by making a special machine

which will do several operations at once. A case in point is the machine built to mill 4 flats and drill 4 holes in the body nut for the Moen faucet, a brass part. The square for the wrench measures  $\frac{3}{4}$ " across the flats, and length of the flats must be held to .630 plus .000 and minus .010". The holes are all  $\frac{3}{16}$ " dia. drills.

The part is held by air clamping and feeds into the drill, which cuts two of the holes in opposite walls of the nut. End mill cutters feed in from either

Milling the wrench flats before this operation, speeds up the job of demounting the part after boring and threading operation on engine lathe with turret attachment. The woman operator jabs downward with wrench as shown here after thread has been cut and spindle is reversed. Otherwise, demounting would be difficult and time-consuming.



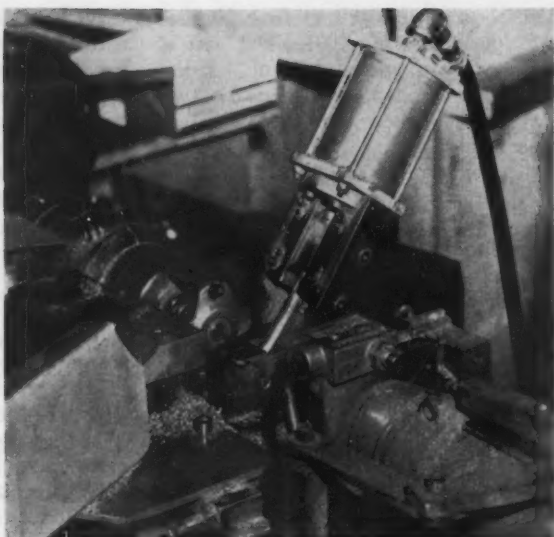
side of the positioned part, cutting two opposite flats. The part is indexed 90 degrees and the operations repeated. Average time to machine all 4 flats and drill 4 holes is  $13\frac{1}{2}$  seconds. One motor drives the two milling spindles, connected by jack shaft, and the drill spindle, figure 3.

The next operations on the same part are done on an Atlas engine lathe with turret attachment. A 2 hp. 3 phase motor is used here for instant reversing. With the first operation a special cutting tool bores a .310 plus .002 and minus .000 diameter and counterbores for the minor diameter of a 9/16-24 EF-2 thread. The second operation taps the thread, the motor reversing instantly for backing out. The part is de-mounted speedily and easily by jabbing downward with a wrench over the wrench flats while the motor is in reverse. Total average time for both operations here, is  $19\frac{1}{2}$  seconds, figure 4.

The instant reversing feature of a three phase motor has also been adapted for tapping two,  $\frac{1}{4}$ " pipe threads in the valve body of the Moen lavatory model. This is a drill press operation, for which a standard tapping attachment that automatically reversed, was formerly used. However, they found it hard to control the depth of the tap and there was some spoilage. By using a 3-phase 1-hp motor and micro-switches, the operation has been reduced from 30 to 14 seconds. In addition, the operator can now control the depth of tap within one thread and there has been no further spoilage.

Another special set-up performs four average time of  $21\frac{1}{2}$  seconds. This requires milling of a .186 plus .002 and minus .000 slot and drilling of 2 holes of .180-.182 and .093-.094 diameter. The

Handle for Moen faucet is held by compressed air vise in this set up and fed into milling cutter, with two drills coming in from the side through bushings in drill jig, to drill holes.



Ten operations are performed on one set-up with this remodeled pre-World War I lathe, part being mounted on fixture in turret of lathe



centerline to centerline dimension is .359 plus or minus .001. The part is clamped in a special holding fixture, the slot is milled, and then the two holes are drilled simultaneously as shown in figure 5. The slot is then milled once more to remove burrs.

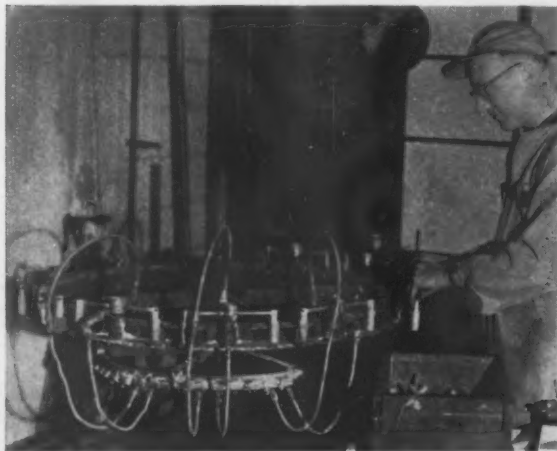
A part for which a special tool literally had to be invented, is the valve body for the wall type kitchen faucet, a brass casting. On each end of the casting where the fixture connects with the hot and cold water pipes, five operations must be performed. These include turning a 1.320 O.D., turning the thread diameter for a 1-3/16-18 NEF-1 thread, facing the end, boring a 3/4" hole, and turning the thread.

For this job, the shop took a pre-World War I, J & L flat bed turret lathe and stripped off the headstock. They mounted a holding fixture on the turret, and bought 4 standard shaper spindles. Two of these spindles with turning tools were mounted to the headstock end. The other two spindles with H & G rotating die heads, were mounted to the opposite end of the

lathe bed. In operation, the turret is used to feed the part into the stationary tools and also as a rotating fixture to turn 180 degrees to engage the die heads after completion of the first operations. The set-up performs ten operations in the total average time of only 65 seconds, figure 6.

A time-saving improvement has been effected in the job of silver soldering several parts, such as the nipple to the tube and the tube assembly to the valve body. These jobs were formerly done by mounting the parts after fluxing, to holding fixtures on a revolving wheel and pre-heating with butane-propane. A torch was then used to bring the parts up to the required 1,250 degrees. Two men were required, one to flux and mount the parts, the other to operate the torch.

Improvement was made possible through use of natural gas and new types of nozzles which bring the parts up to the required temperature without boosting by a torch. New and larger wheels were made, and set up



Changing to natural gas and use of larger holding wheels, or jigs, reduced time of silver soldering on several operations and cut down from two men required, to one.



so that two nozzles focus on each holding fixture or station. More stations were installed on the wheels, increasing both the heating and the cooling time. Only one man is needed for most silver soldering, to flux the parts, place them in the fixtures, and remove them when they have been heated and have cooled at the completion of the cycle. On a typical operation, that of welding the spout assembly, the time has been dropped from 106 to 68 seconds, figure 7.

The shop's quality control set-up has more than paid its way, Mr. Schlamp observes. A full-time inspector is given

full responsibility for checking according to definite shop procedures.

One way inspection has paid off has been in the complete standardization of parts that has resulted, Mr. Schlamp notes. This has been reflected in faster time of assembling the parts of the faucets. In part because of inspection and in part because of other production improvements, they require just half as many women to assemble an equivalent number of faucets as they needed several years ago. And inspection has almost eliminated rejections on subcontract work.

The End.

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## Cold Forming Titanium Sheets

A METHOD of cold-forming titanium sheets to produce curved cylindrical shell beads without cracking has been developed by Chance Vought Aircraft, Incorporated of Dallas, Texas.

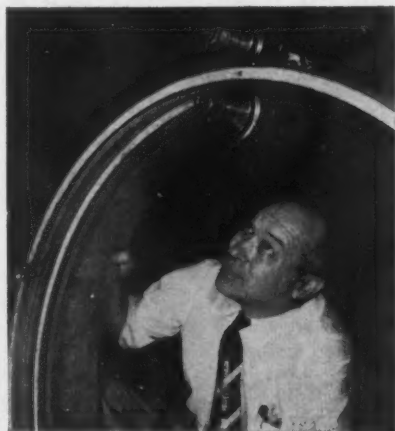
A standard Niagara machine was adapted to do the work. The metal to be beaded is fed between adjustable tension rotating draw rings. Both external and internal beads were made on .012 stainless steel and .012 RC-70 titanium. In the former metal they were .77" in height and the internal beads .57" in depth and .25" in width. Springback of the sides was about 4°. Formability of titanium was less due to its lower percentage of elongation.

The flow of metal as it is being rolled in the Niagara machine is controlled by two or four adjustable hoops which hold the metal on both sides of the roller wheels. For internal beads only the two inner hoops are used; for external beads both inner and outer clamps are used. The bead is rolled with the grain of the metal normal to the longitudinal circular axis of the bead. When they are across the grain, beads of various shapes and depths can be produced

without the danger of cracking.

The method shows promise of being applicable to beading and corrugating of many closed uniform sections other than cylindrical shape. Other forms may be elliptical, kidney-shaped, or irregular. Chance Vought's tool research division is investigating possibilities in those shapes as well.

The End





# Frozen Mercury Process Investment Castings . . . Case Histories Indicate Machining Savings

By **Irving R. Kromer**, Vice President  
Mericast Corporation  
New York, N. Y.

THE frozen mercury process of investment casting will produce parts with exceptionally thin walls, as well as parts which must possess exceptionally smooth surfaces and intricate interior sections. Thus, resulting in cost savings due to the elimination of expensive subsequent machining operations on parts formerly produced by some other method. Many firms have completely re-designed their parts to permit their production by the frozen mercury process either because of the high cost of other methods, or because they could not be satisfactorily produced by other processes.

One of the principal reasons why the frozen mercury process can produce such thin and dimensionally accurate wall sections, is the thin ceramic mold that is formed around the frozen mercury pattern, and which receives the molten metal after the mercury is melted out.

This thin shell, normally only  $\frac{1}{8}$ -inch thick, enables gases formed by

- *produce parts with exceptionally thin walls*
- *obtain exceptionally smooth interior and exterior surfaces*
- *produce intricate interior surfaces*
- *eliminate machining after casting*
- *many previously "impossible" parts can be cast*

the incoming metal to escape readily through the porous ceramic wall, instead of creating a back pressure that might retard the proper flow of the molten metal.

These molds may also be pre-heated prior to the pouring of the metal to likewise aid the flow of the metal. In certain instances, a vacuum is applied through the mold to speed the flow of the metal and to assure even distribution throughout the intricate passages of the mold itself. Of great im-

portance is that all these factors not only aid in the casting of thin walls, but in addition, produce a structure of superior metallurgical qualities.

### Specific Case Studies

How these important features of the frozen mercury process have been utilized in the production of specific parts, is illustrated by the following two case examples.

The first, figure 1, is an electronic part which also functions as a structural unit. It is made of 356 aluminum; one of its walls is limited to a thickness of .050", with this is an allowable tolerance of plus or minus .006". It is four inches wide, 16 inches long, is essentially a rectangular cross section, has a 120° elbow at one end, and is closed at the other. There are rectangular slots spaced through the top side into the interior passage over the length

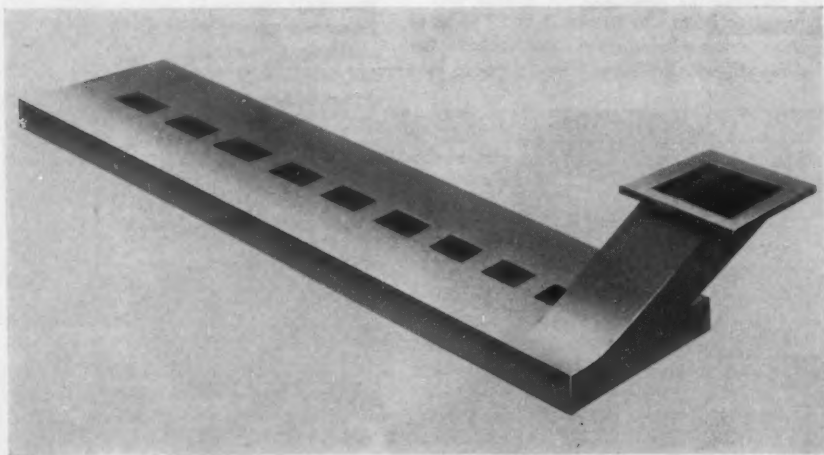
of the casting. It weighs approximately two pounds.

Principal problems in the production of the part include the close dimension that must be held throughout its entire 16-inch length, its smooth interior passage with 63 microinch finish throughout, and the maintenance of extreme accuracy of straightness (within .020), throughout the length of the part. In addition, the part must be free from porosity and it must pass a 100% X-ray inspection.

The user initially considered several precision production methods. While sand casting could have been used, a disproportionate amount of additional machining time would have been required to bring the exterior walls down to the required tolerances. In addition to the time involved, the machining would have been overly costly.

Interior sections would have required

**1. An electronic part made of 356 aluminum. One of its walls is limited to a thickness of .050". Principal problem was close dimension along its 16 inches and the obtaining of smooth interior passages with 63 microinch finish throughout.**



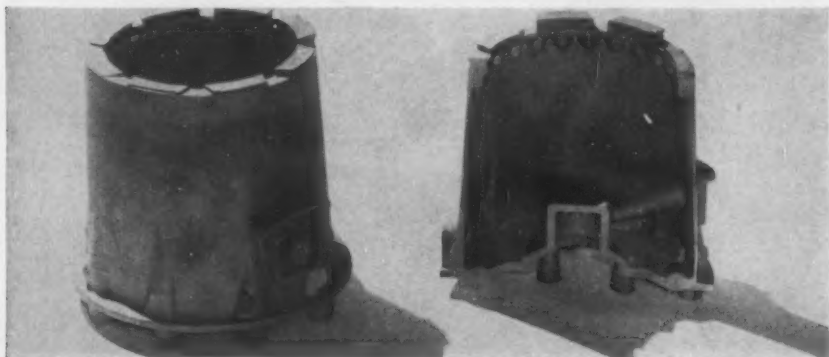
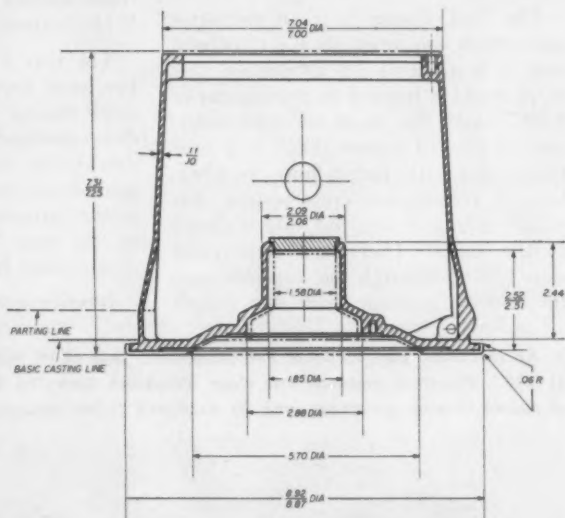
both expensive and tedious hand tooling since these areas could only be cast to general shape and not to dimensional requirements. And because of the extremely thin sections, it was feared that hand tooling would have produced buckles and break-throughs, thus causing complete reject of the part.

Produced by the frozen mercury process of investment casting, the part can now be used as cast. Exterior surfaces

require only a slight amount of additional fabrication, principally to allow for joining of additional components.

Because of the booking feature of the frozen mercury process (the ability of the frozen mercury to form a perfect "weld" with just the slightest hand pressure), the pattern is produced in two dies, then booked prior to investing. The booking length is the full length of the part.

2. Stainless steel part has a cylindrical shape and weighs 17 pounds. Problem was the casting of very thin walls over a large area and the maintaining of precise dimensions. Along the .100" wall thickness certain cross section thicknesses range up to  $\frac{3}{4}$ ". Special techniques had to be developed to feed these thick and thin cross sectional areas without cracking the part upon solidification.



The frozen mercury process is considered the only economically feasible method for producing the part in its present form.

The second example, figure 2, is a part used by the aircraft industry. It is made of stainless steel, has a tapered cylindrical shape, and weighs 17 pounds. Overall, it is 7¼" in height, with a diameter of seven inches at its open top end, and a diameter of nine inches at its closed base. At its most critical areas, wall thicknesses measure only .100.

The part is hollow and its inside walls are smooth. Interior design features include an inverted chamber which is cast as part of the base, a cast-in-place tube from the chamber extending through the side wall, and a ring of bosses which encircles the upper inside rim.

The main problem in producing the

part was the casting of very thin walls over such a large area, and maintaining the precise dimensions involved. Along with the .100 wall thickness, certain cross section thicknesses range up to ¾". Thus special techniques had to be worked out to feed these thick and thin cross sectional areas without cracking the part upon solidification.

In addition to this problem, the part demanded 100% X-ray and 100% Magnaflux inspection.

Because the part is of stainless steel, machining to tolerances was again economically non-feasible. In fact, the machining of interior sections could not, under any circumstances, meet dimensional requirements. Produced by the frozen mercury process, the part requires the very minimum of machining. A total of five booking operations is required to produce the part.

The End.

---

## Materials handling exposition to be in Chicago, May 16-20

The 1955 National Materials Handling Exposition will be held during the week of May 16 to 20 in the new exposition hall recently completed as an addition to the International Amphitheatre, Chicago.

More than 200 companies will participate and their displays will cover an area of 115,000 sq ft. This will represent a 15 per cent increase over the exhibit space used in 1951 when the last Chicago exposition was held.

Founders and producers of the event are Clapp & Poliak, Inc., New York. A materials handling conference will be staged by them concurrently with the exposition to permit visitors to supplement their inspection of machinery with

discussions of case histories of materials handling installations.

The theme for the show and conference is "The Concept of Obsolescence," selected because it emphasizes the rapid out-moding of handling equipment.

The show's emphasis will be on new systems for handling rather than on particular single types of equipment which characterized previous expositions.

Conveyors, hoists, monorails, cranes, tractors, trailers, hand trucks, elevators, stacking units, railroad car loading equipment, and the like, will be demonstrated under simulated factory conditions. Advance registration cards may be obtained without charge from Clapp & Poliak, Inc., Dept. BB, 341 Madison Ave., New York 17, N. Y.

# Time Study . . . part 8

## Payment For Scrap

### Selling New Standards Program to a Union (Case History)

### Tailor-Made Low Cost Movies

By **Harold R. Nissley**  
Professional Engineer  
Cleveland Heights, Ohio  
Cartoons by **Glueckstein**

#### Payment for scrap

SHOULD an incentive operator be paid only for good pieces turned out? The answer is "Yes" (under certain conditions) and "No" (under other conditions).

The conditions under which an incentive operator should be paid for scrap are: (a) Where the operator has little or no control of the scrap condition; (b) where an operator's piece-rates are not high enough to cover the non-paid-for effort that went into the scrap production; (c) when industry-wide practice is to pay incentive operators for scrap; (d) when scrap is not excessive (under 10%); (e) when the contract calls for payment of good and bad pieces produced.

When these conditions are reversed, the operator is not paid for scrap. Thus an operator is not paid (and should not be paid) for continuously

high scrap resulting from extreme carelessness. But scrap resulting from an occasional bit of carelessness should be borne by the company, in the writer's opinion. If such carelessness persists and increases in individual cases, warning notices should be given that will ultimately displace the operator.

But most scrap that has come to the writer's attention has been caused by factors beyond the control of the operator: Poor materials; poor tools; improper coolants; infrequent and improper checking by quality control; poor prints; inadequate supervision; poor job design, etc. Conditions such as these do not, of course, entirely relieve the operator of his responsibility to keep close watch on scrap (or shrinkage as it is called in some shops).

It is, therefore, possible that a shop could logically set up a system of "Pay

1. A good case can be made for paying for scrap turned out by incentive operators. Not as good a case can be made for refusing to pay for scrap.

2. A radically new standards program can be sold to "tough" unions: have something better to offer than present program; if the level of incentive wages does not fall; if individual wage adjustments are not too many nor too radical; if the system is not complicated; if you try the system out; if you have a good live bunch of industrial engineers who can sell standards as well as develop them.

3. Tailor-made black and white job movies can be made for individual jobs for as little as \$5 for film costs (4 minute movie). This can be further reduced by going to the frame-per-second 16mm. "movie", if the primary object is time measurement and not motion study. High speed movie which freezes such fast action as commutator arcing, chips from machine cutting tools, glass and steel fragmentation, etc.

and no pay" for scrap. Under a certain set of conditions (i.e. factors beyond the control of the operator) hourly or incentive earnings will be paid for scrap (as well as good pieces). But an operator may not receive any payment for scrap turned out due to his own carelessness or temporary lack of skill or diligence. However, the problem of administering a dual standard for scrap payment becomes a little complex when frequent cases come up where it is difficult to tell what or who caused the scrap. Because of the ensuing arguments, many companies have found it easier to pay for a certain amount of scrap; and when scrap exceeds certain pre-determined levels, other (non-financial) remedial action is taken.

If we assume full incentive payment for scrap, exactly how will the operator's earnings be affected? Some of the scrap worked on may take even longer to "finish" than acceptable units. Most scrap, however, takes less time up to the rejection point (by the operator) than a fully completed and acceptable unit. If the scrap figure is large (over 10 per cent), detailed measurements of frequency, types of scrap, and direct labor (i.e. time) expenditure per type should be made. Such measurements can be made by time study observers over 8 hour periods; they can also be made by the combined efforts of operators and foreman.<sup>1</sup>

The method of allowing for scrap in the incentive earnings of the operator is similar to other allowance calcula-

<sup>1</sup>In short cycle work (cycles under 0.10 minute) where scrap is frequent and would, therefore, require constant bookkeeping on the part of the operator or the foreman, some firms have found it convenient to arrange a battery of lever-operated counters; each counter represents one kind of scrap. Thus at the end of the day the operator and/or foreman merely takes the scrap totals from these individual counters.





tions described in earlier time study articles in the BLUE BOOK. The method the writer uses and prefers is that of finding out how much time during an 8 hour period is consumed in handling scrap. If this amounts to 48 minutes, a 10 per cent scrap allowance is added to the other allowances. This total allowance figure is then subtracted from a clock hour of 60 minutes to get a net working hour into which the total cycle time is divided. When this procedure is followed, only good acceptable pieces are counted at the end of the day for payment because the scrap pieces have already been incorporated into the piece rates.

A quicker but less accurate method is that of paying straight piece rates for all pieces—good and bad—turned in at the end of the day. This method is one of the many causes of incentive creepage, because it is not based on time measurement. As indicated above it may take but a fraction of time to turn out a piece of scrap compared

with turning out a finished acceptable unit. Thus it is possible for an operator's earnings under this quick method to rise and fall with scrap!

### **Selling a New Standards Program to the Union**

The writer has worked with scores of works managers during the past 12 years. Most of these men stoutly affirm they have the worst unions to cope with found anywhere in the United States. Although I have never served a union as a consultant I have not found one of these unions that measures up to (down to) the mental and performance levels portrayed to me by some of these executives. This does not mean, of course, that I have always been successful in selling a new standards program or even a single work standard to a union or an operator; but when I fail in such sales effort I attribute my failure (a) to a non-salable product and/or (b) to my own clumsiness in selling.

The problem of selling work standards has been discussed and actual cases have been cited in earlier time study articles in the BLUE BOOK. So the writer will not review these work standards selling techniques here. But there is a tremendous difference between selling a single work standard affecting one person (or a small group) and selling a new standards program affecting all incentive operators in the shop.

Very few companies will send out a young engineer or a new salesman to sell a \$50,000 or \$500,000 piece of equipment. Yet many companies will expect a local industrial engineer (who may lack sales finesse) or a local personnel manager (who may lack industrial engineering knowledge) to install

a new standards program within a few weeks or months—a standards program that may affect scores or thousands of workers and a direct labor budget of \$1,000,000 or \$100,000,000 a year.

When a new standards program is contemplated, more and more companies enlist outside professional engineering help who are equipped both technically and sales wise to do a complete installation job. Many companies make the mistake of turning the entire job over to these outside specialists who are able to gain acceptance of the program before they leave but who have not had the time to coach the local time study and industrial relations personnel in the administration of the program. The result is frequently disappointment and failure. A better plan is to collaborate with these professional engineers and to insist they remain until after the plan is in smooth operation.

But because the theme of this series of time study articles is "do it yourself," the writer will relate the most successful privately installed standards program that has come to his attention in the last 28 years.

**Case Study.** This involves a single division of a company which employs around 100,000 people. The division which undertook this post-war installation of a new standards program employed approximately 10,000 people.

Piece rates got far out of line during World War II. Although this company and division had set piece rates by conventional time study for decades, the chief industrial engineer (a non-college man) was willing to explore any new technique that might give the division more consistently reliable results than single time studies.

One of the time study men in this division ran across an article on a system of pre-determined times in a trade magazine. The article was well written and intrigued most of the time study engineers and a few of the division operating men. But any system of pre-determined times was a radical departure from the conventional time study techniques employed for decades in this division.

The chief industrial engineer did not, of course, know how well the new system would work or whether he could sell it to the union after he and others were satisfied it was a better system than the one they were using. Instead, therefore, of using the new system to set new standards he and his staff continued the old method for several months but paralleled their stop watch efforts with daily trials of the new technique.

But conducting experiments on a new system while operating under an



old system has its disadvantages aside from the added time taken by time study personnel. Frequent production floor probing by time study analysts using first one method and then another led to frequent discussions and arguments and hampered the analysts who were attempting to reconcile tabular time values with stop watch studies and production figures. So one additional sales ingredient was added—the 16mm. job movie. Short (one- to four-minute) movies were made of every job analysed by the old and the new methods; the movies soon became the basis for elemental analysis; and without these movies the division time study engineers, according to their story, could never have sold the new system.

Within a year, enough data had been accumulated to assure this courageous bunch of pioneers that they were on the right track—but not without many engineering conferences where terms were better defined and data more refined.



One day a meeting was called in a company conference room. The Works Manager pointed out to the union officers the many defects to the old system of setting work standards—defects which had resulted in hundreds of hours of grievances and in ridiculously loose piece rates in many instances and also few tight rates. This was, of course, all too well known to the union officers. After these preliminary remarks he turned the meeting over to his chief industrial engineer.

The chief industrial engineer started from scratch. He explained the origin of the body-member time tables. He told the union officers that the new system would overcome one of the main objections to the old system—that of rating the operator.

After this introduction the chief industrial engineer then projected three familiar jobs onto the screen. One of the time study analysts then analysed each job using movie “frames” to identify (and partially verify) the individual time values assigned to each finger or arm movement. These times were totalled and a work standard calculated before everyone present.

This whole presentation was so smooth and convincing that the union officers could not put their fingers on a single defect. But, of course, they were unwilling “to buy” anything as radical as this merely on the basis of three demonstrations. So they left the conference room with some statement as this: “We are not buying this new system; but we will not interfere with an initial trial of it. However, as soon as anyone gets hurt, out it goes.”

That was 9 years ago. Today, according to top level company spokesmen, this division is doing the best job

of incentive administration of any other division in the entire company.

This case is related in considerable detail to show what can be done without the aid of consultants, (a) if a company has a good live bunch of engineers and (b) if a company is willing to spend some time and money for experimentation and equipment. Indeed, these two "if's" are usually complimentary: A company that gives its industrial engineering department considerable latitude and appropriation frequently gets a big spark from this activity. Conversely, a good live bunch of industrial engineers is frequently able to convince "top brass" that a new system should be explored rather than patch up the old system or that camera and projection equipment will reduce the cost of grievance sessions and minimize incentive creepage.

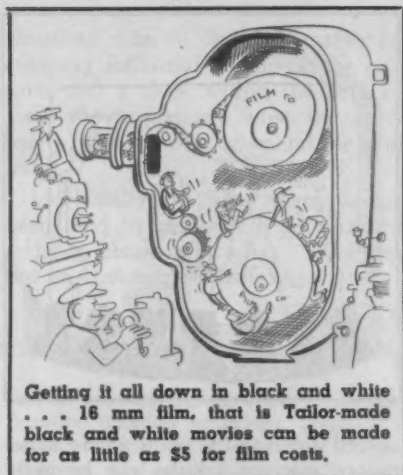
### Tailor-Made Low Cost Job Movies<sup>2</sup>

There are three kinds of low cost industrial job movies today: (1) Conventional speed (silent, 16 frames per second); (2) high speed (128 to 3200 frames per second); and (3) one-frame-per-second time-lapse.

#### 1. Conventional 16mm Job Movies.

The short low cost job movie is familiar to most industrial engineers and many operating people. It usually runs from one to four minutes (25 to 100 feet of film). It generally shows one or more work cycles of operation.

Such low cost movies help solve many problems. They accelerate work simplification thinking. They narrow divergent points of view about work



Getting it all down in black and white . . . 16 mm film, that is Tailor-made black and white movies can be made for as little as \$5 for film costs.

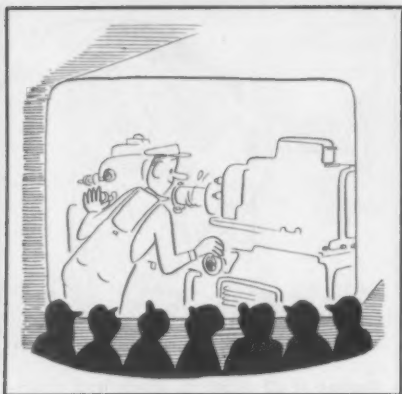
standards. They aid in arbitration cases involving methods and/or work standards. They keep an historical record of a job at the time the standard was set so that incentive creepage can be more easily controlled. They help "sell" new methods, new work standards programs, or new standards.

The cost of the conventional black and white shop movie is nominal. The film cost for a 4 minute movie will run between \$5 and \$10. The time of the photographer will vary depending on a number of factors—it may be as little as 20 minutes of picture shooting time.

#### 2. High Speed 16mm. Job Movies.

A high speed movie (128 to 3200 frames per second) is designed to slow down fast action—movement of projectiles, electric arcs, machine speeds, and fragmentation. This action is

<sup>2</sup>For a more complete description of some of the low cost job movies with case illustrations see the writer's articles: "Using a Movie Camera in Setting and Selling Production Standards," *MACHINE & TOOL BLUE BOOK*, September, 1951; and "Sixteen Millimeter Industrial Movies," *MILL & FACTORY*, December, 1948.



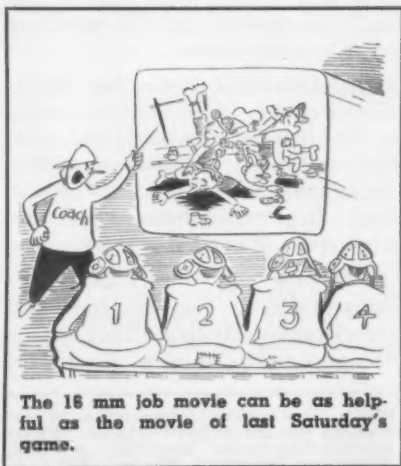
slowed down to the point where material or machine failures can be more readily diagnosed. Some notion of the effect of such high speed movies may be gained by viewing "slow-motion" (64 frames per second) movies of football plays, horse racing, golf strokes, and other sporting events. But slow motion movies at 64 frames per second are fast compared with the film and camera speeds of the high speed movie technique of 128 to 3200 frames per second.

Because of the film footage used in high speed movies, the film costs are generally higher than in conventional movies. However, this cost is partly off-set by the small increment of time during which the action takes place. Typical film cost for high speed movies range from \$25 to \$75.

**3. Frame-per-second Time-Lapse 16mm. movies.** Just as some machine action takes place in a fraction of a second, most factory operator movements take one or more seconds to complete. The need for slowing down such operator action is, therefore, usually not important. Indeed, there may

not even be a need for showing action at normal speed, if the action is of long duration and, if the film is to be used primarily for elemental time analysis work. If, therefore, a series of 16mm. pictures can be taken at one second intervals (instead of 16 pictures per second), several things can be accomplished: (a) A time study observer can load 100 feet of film into his camera once an hour (loading time, 90 seconds) and go about his time study work; and (b) the film costs for such frame-per-second "movies" is 1/16 that of conventional speed movies (16 frames per second). Thus, it is possible to record—second by second—8 hours of set-up or operational activity for as little as \$40 for film costs.

Such frame-per-second camera attachments are available that will reduce both the cameraman's time and the film costs. The primary limitation to this time-lapse technique is that the resulting pictures when shown at regular projector speed (16 frames per



second) are jerky and resemble many of the old time movies. But this technique is not designed for "show" purposes. It is designed to record the activity pattern of one or more operators, second by second, over a period of time. Such a film, when put through a special time study projector or a film viewer, will yield elemental time increments far more convincing in most

situations than all day time studies by company industrial engineers; the pictures and a clock within the field of view shows precisely what the operator(s) did, at what time, and for how long.

Incidentally this same technique has been used by marketing specialists in order to obtain a pictorial 8 hour record of customer-salesman situations.

End of Part 8.

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## L. S. Starrett Co. Celebrates 75th Anniversary During 1955

Nineteen fifty-five will mark the diamond jubilee of precision toolmaking by the L. S. Starrett Co., Athol, Mass.

In 1880, Laroy S. Starrett invented and began to manufacture the combination square. From a room in a small machine shop, the company has grown to become the largest manufacturing plant in the world devoted exclusively to the production of mechanic's hand measuring tools and precision instruments. The combination square of 1880 has become an imposing catalog of more than 3000 items. A handful of craftsmen has become an organization employing from 1500 to 2500.

Through the years the L. S. Starrett Co. has performed a noteworthy service in the promotion of better knowledge and use of fine tools and the encouragement of higher standards of workmanship. In vocational education schools

and in cooperation with industrial apprentice training programs, invaluable assistance has been provided to instructors and students through such media as training films, illustrated catalogs, tool charts, reference charts, text books, blueprint sets, booklets, folders, and displays.

The company will commemorate its diamond jubilee throughout the whole of 1955. Special events will include the announcement of new tools and the release of a de luxe catalog.

The first model of the Starrett combination square was made in this small machine shop. The L. S. Starrett Co. was founded when the inventor bought the shop in 1880.



The L. S. Starrett Co. today is the world's largest plant devoted exclusively to the production of precision measuring tools, dial indicators, steel tapes, steel rules, etc.





# Pipe-Flange Facing Machine

By Tom Brown, Consulting Tool Engineer

DURING the manufacture of high-pressure water tube boilers it is often necessary to face the flange at the end of a pipe to a smooth finish. Although many high-pressure steam pipes now have flanges pre-machined before the two are assembled together, the welding of the joint between them usually distorts the flange face which must be perfectly flat to ensure metal-to-metal contact when the pipe assembly is erected. Final facing is then necessary. Many of the pipes are bent and contorted to odd shapes and the procedure for facing the flanges was to mount them on the table of a horizontal boring machine so that they could be worked on by the revolving cutting tool mounted in the facing head. The extended length of some pipes can be 20 ft. and this necessitates the provision of auxiliary support for the length of pipe which projects beyond the machine table. Support was usually provided by block and tackle and sling-chains suspended from the roof. The arrangement took a long time to set up

- *portable tool faces the flange*
- *replaces horizontal boring machine*
- *tool faces 7" dia. (max.) flanges having bore dia. 2 and 3½ inches*
- *fixing tool to pipe solved by expanding mandrel*
- *facing head is in form of a disc*

and to adjust and was very unsatisfactory.

The maximum depth of cut taken on any pipe flange face rarely exceeded 1/8 in. and it was thought that a more suitable method of facing the flanges would be to use a portable tool which could be attached to any pipe as it laid on the shop floor or in some suitable support, also standing on the floor. The tool would be smaller than the component and would be a much smaller capital investment than the horizontal boring machine.

The portable pipe facing machine as it was designed, finally, is illustrated. It is designed to face pipe flanges having a maximum diameter of 7 in. on pipes having bore diameters between 2 and 3½ in. The proportions of the tool can be varied to suit a larger range of flange diameters. The sizes specified here were suitable for one range of pipe and flange sizes in constant demand.

Fixing the tool to the pipe was the first problem to be settled by the designer. Gripping the pipe or flange exterior by means of clamps, were considered and rejected as being too bulky. Accordingly, the mounting finally evolved took the form of an expanding mandrel of a rather novel form of construction. The left hand end of the mandrel fits in the pipe bore and the right hand end supports the revolving flange facing tool.

The actual expanding and internal gripping members of the mandrel were in the form of flat links with radiused ends. The inner ends of the links are drilled to take swivel pins which can be seen clearly in Section X-X of the drawing. The links were supported sideways in radial slots machined in the mandrel; the slots are a tight fit for the thickness of the links so that they do not slip about when gripping the pipe interior.

When swivelled outward on their pins, the links bear on the interior of the pipe wall in two annular groups of three each. Six points of support are thus provided by the links which are made exact duplicates of one another by machining them to final shape whilst stacked together to form one integral unit. They are case-hardened to resist wear.

Expansion of the links outward is accomplished by the central clamping bolt running down the axis of the mandrel. The bolt has a centrally disposed shoulder and this bears against the rear face of an expansion bushing. The bushing is chamfered off at one end to form a sloping edge which bears on the radiused end of the set of links; when the bushing is moved leftward, it pushes the pivoted links outward and forces them into the wall of the pipe. A second chamfered bushing is provided for the left-hand set of links and is threaded internally for engagement with the thread on the central bolt. When the bolt is turned, the tendency is for the chamfered bushings to come closer together and thus expand the links outward so that they grip the pipe bore. The bolt is extended to the right so that a hexagon head outside



the mandrel is provided for engagement with a suitable wrench.

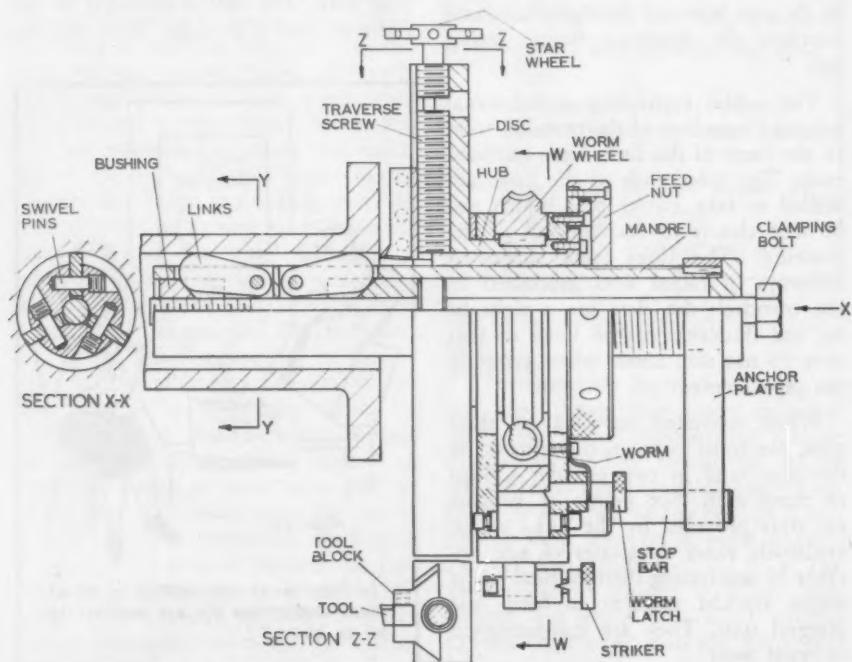
The mandrel is hollow for the greater part of its length in order to reduce its weight and to admit the shouldered portion of the clamping bolt. On the mandrel exterior revolves the facing head which carries a cutting tool which can be fed toward the pipe flange in order to put on the cut.

The actual facing head is in the form of a disc having a centrally disposed hub integral with it. The hub bore is lined with a bronze bushing for revolving on the exterior of the stationary mandrel and the hub exterior carries a worm wheel keyed in place for the purpose of revolving it.

Facing tools are mounted in a tool

block which slides radially in a dovetail-section slot running across the face of the facing disc, as shown in Section Z-Z. The tool block is traversed by a semi-circular screw thread in its back face engaging with traversing screw, also placed radially in the disc. The traversing screw is similar in construction to that of a screw in a four-jaw chuck, the tool block working like a chuck jaw. A thrust plug prevents the screw moving axially.

Feeding of the tool across the flange face is by the old method of a star-wheel and striker, chosen because it is the simplest way of doing the job. The star wheel is integral with the traversing screw and the striker for it is mounted on the lower side of the worm



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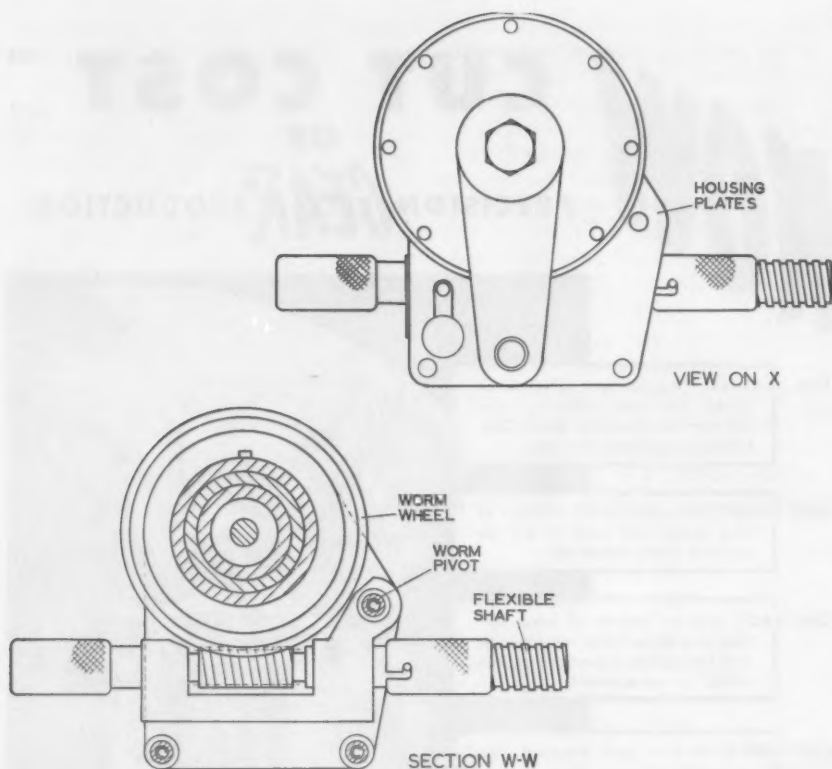


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driving unit. The striker can be rendered inoperative by pulling it horizontally away from the star wheel and giving it half a turn.

The housing for the worm drive which rotates the facing head comprises a pair of flat plates placed one on each side of the worm wheel and projecting downward. They bear on the exterior of the rotating hub of the facing head but are prevented from rotating by the anchorage plate which is keyed to the stationary mandrel. The anchorage plate has a horizontally projecting stop bar at its lower end. The left

hand end of this bar is fixed to the worm drive housing plates, whilst the right hand end can slide axially in the hole in the anchorage plate.

The plates forming the worm drive housing are joined together as a unit by pillars. A side view of the worm mechanism is illustrated in Section W-W. The worm is supported in a U-shaped bearing unit with a knurled handle at one end. At the other end is a bayonet type connection for a flexible-drive shaft. The shaft is attached at its other end to a standard flexible drive power unit comprising an electric

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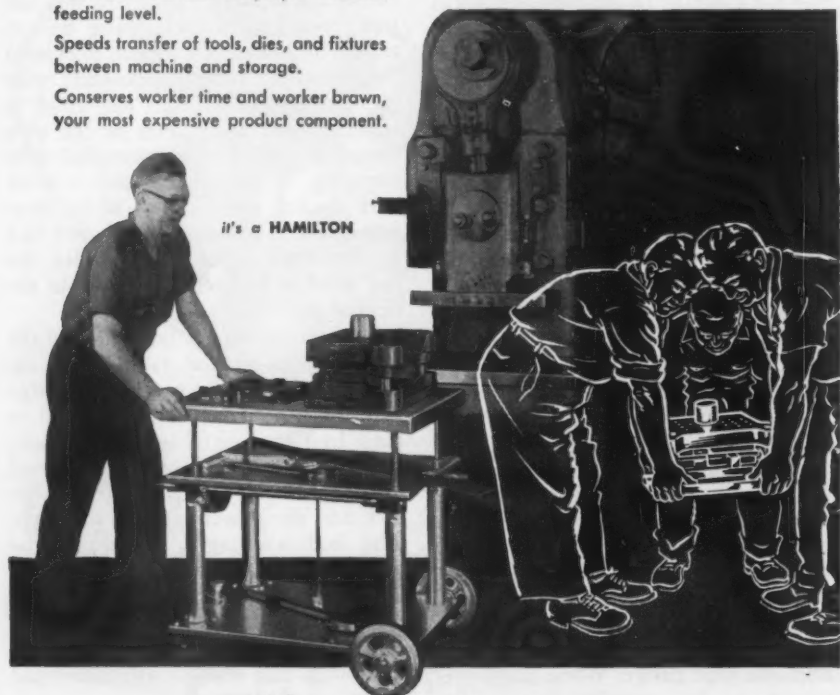
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motor and a three-step cone pulley set, for speed adjustment. The driving unit is standard product and is mounted on a swivelling stand and fitted with castors for ease of movement. It stands adjacent to the working place of the pipe-facing machine and the two can be disconnected or joined up very quickly. Making the driving unit separate from the pipe-facing unit enables the latter to be moved about easily and carried by one man from one pipe flange to another.

To connect or disconnect the power quickly from the facing head, the worm is arranged to drop out of engagement with the worm wheel when the latch pin is pulled out. The worm unit is pivoted at one end on a pin and the other end is held upward to keep the worm in engagement by means of the latch; pulling of the latch allows the worm to drop out of engagement with the worm wheel. It can be lifted up to re-engage the drive by means of the knurled handle.

To bring the facing tool closer to the pipe flange for increasing the depth of cut, the facing head and its hub can be screw-adjusted axially along the mandrel. The exterior of the mandrel is threaded and with it engages a large diameter knurled feed nut with holes for engagement with a bar, drilled in its periphery. One side of the feed nut is recessed and encloses a ring attached to the worm housing plates. The nut also has a rim attached to it so that it can pull the worm housing to the right and pull the facing head and tool away from the pipe flange. When the nut is turned in the opposite direction, it pushes the complete facing head and the worm drive towards the pipe flange. It is to compensate for these traversing motions that the anchorage plate en-

gages slidably with the stop bar mentioned earlier. Once the depth of cut over the flange has been set, the large nut can be locked in position; the locking means is not shown but it comprises a simple headless set screw placed radially in the nut. When the screw is tightened, its lower end bears on the mandrel thread and locks the two together. A brass pad is interposed between the screw end and the mandrel thread to prevent damage.

To use the pipe-facing machine, the general procedure is as follows. The end of the mandrel is inserted into the pipe bore and the clamping bolt is turned by means of a wrench to expand the swivelling links into contact with the interior walls. The tool head is traversed out to the rim of the pipe flange by hand. This is accomplished by engaging a specially shaped wrench with the star wheel on top of the traverse screw. The wrench is shaped like a carpenter's brace and enables the tool head to be brought rapidly to the desired position.

The cutting tool is brought into the desired position for taking the cut across the flange by turning the large adjusting nut which is then locked in place by means of its screw. The flexible shaft drive may now be connected to the worm by means of the bayonet lock and the power can be turned on. The feed is engaged by turning the striker pin knob and allowing the pin to spring outward so that it engages the spokes of the star wheel. The cutting tool will now feed steadily across the flange face without attention until it reaches the pipe bore.

The facing head is stopped by disengaging the worm drive, pulling out the latch pin to do this so that the worm drops. To prevent the tool from

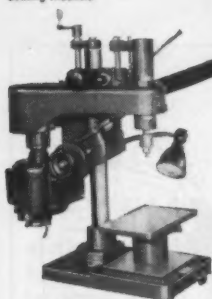
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cutting a mark across the machined flange face, the tool head is retracted by turning the large nut and the cutting tool may be traversed rapidly back to the starting point by using the special wrench.

For cast iron flanges, a cemented carbide tipped tool of the form illustrated is used for roughing cuts. For finishing cuts, a scraping tool of the traditional type used for cast iron may be employed. When this scraping tool is used, the marks where the star wheel spoke strikes the pin are not visible. Cemented carbide tools are also used for steel flanges.

This portable tool has proved very suitable both for production and for maintenance work. It is often necessary to re-face pipe flanges on existing installations. One procedure has been to remove a complete section of heavy pipe and take it to a lathe or boring machine for re-facing. By using the portable pipe facing machine, the pipe flange can be exposed for surfacing whilst it is still in position on its hangers and the facing machine applied to it. The heavy work of removing a complete pipe section is thus avoided.

**The End**



# PRESS-RITE

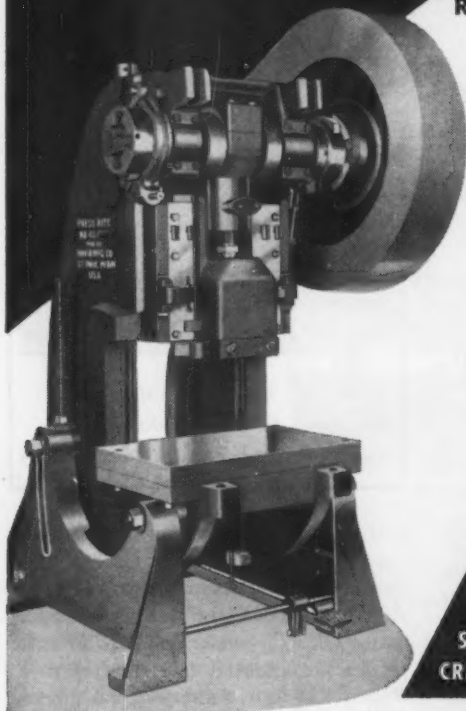
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## Carbide Straddle Milling Solves Difficult Job

TWO side milling cutters with solid carbide inserts and a load meter for the mill served to break the back of a difficult milling job in the Rockford, Ill., plant of Robert H. Brooks Co. recently. The operation entailed straddle milling the sides of a rear spar lock fitting for a jet fighter plane.

Material was an SAE 4140 forging, heat treated between 40 to 43 Rockwell C.; carbide was Carboloy's 370.

The blades of the two 9" dia. straddle milling cutters used are similar to the common throw-away employed in single-point tools, and are ground on all six sides.

The part is first set up to pass between the cutters so that .062" of material is removed from each side. The part next is brought up into the cutters so another .083" of metal is removed from each side for about half the surface, leaving a 4½" radius between the two steps.

A load meter used in conjunction with the cutters keeps the proper tolerances on the fitting, by preventing the

*material: SAE 4140*

*tool: 9" dia. straddle milling cutter  
and 4½" cutter*

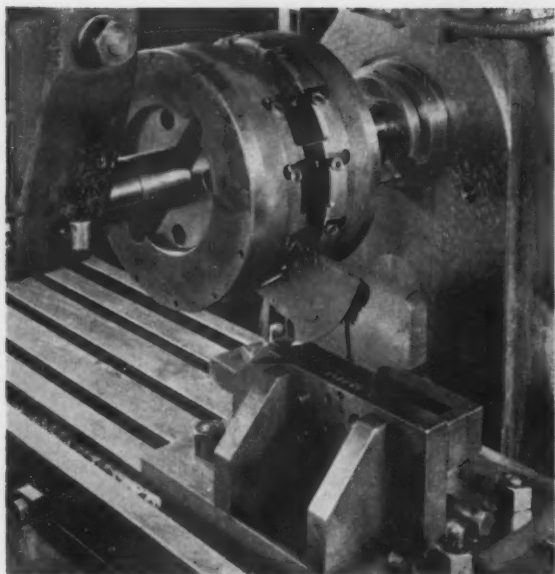
*speed: 275 rpm or 650 sfm*

*tool load: .0025" per tooth*

*load meter indicates tool wear*

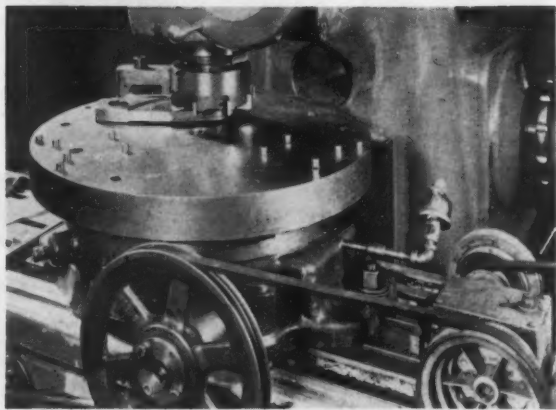
cutters from reaching an over-dullness condition. When the blades are new, the meter usually registers 125. As they become dull, the reading increases; thus, when the meter registers 140, the blades are indexed one quarter turn. When the four corners of each blade have been used, the blade is turned over in the slot and the four corners on the other face are used. The blades are ready for resharpening when all eight corners have been used.

During the operation, the pair of cutters rotate at 275 rpm or 650 sfpm. They are fed into the pieces at the rate of 8½" per minute or approximately .0025" per tooth.



First operation — straddle milling sides of rear spar lock fitting for jet fighter plane at Rockford, Ill., plant of Robert H. Brooks Co. Two 9" straddle milling cutters with carbide blades remove .062" of material from the heat treated 4140 steel forging.

Close up of "blending" operation in which a  $4\frac{1}{2}$ " cutter, using carbide cutting tips, face mills first one side then another of straddle milled fitting. To keep feed small, special motor-driven fixture is employed to rotate work slowly past the cutter.



Following this operation, the surfaces of the fittings are ground. Because of the  $4\frac{1}{2}$ " radius on the part it is impossible to grind a perfect corner in this arc. The company thus grinds only the largest portion, leaving a small portion in the arc to be blended.

In the blending job, a  $4\frac{1}{2}$ " cutter comes into play. It is set up to face mill one side of the part at a time. A special motor-driven fixture is used in the setup to rotate the part slowly past the cutter. This keeps the feed very small, as the cutter rotates at 1300 rpm.



This cutter, also is tipped with grade 370 carbide and provides such a fine finish on the fitting that when plated it is impossible to determine the blend line.

As much "mileage" as possible is obtained from the carbide. For example, in resharpener the 9-inch cutters, all four edges of the blank are ground. The blade is reduced in size by .025"

at each regrinding. One of the cutters is designed to use  $\frac{7}{8}$ " square blades. When this blade is reduced by regrinding to  $\frac{3}{4}$ " size, it is transferred to the second cutter which is designed to use blades  $\frac{3}{4}$  to  $\frac{5}{8}$ " square. When blades reach less than  $\frac{5}{8}$ " size, they no longer are useable on the operation.

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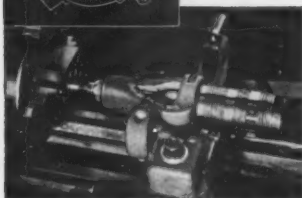
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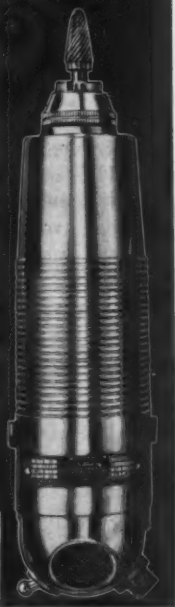
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# Many Electronic Components Made by Hydraulic Presses

By **Ben M. Tollerio**, Superintendent, Machine Shop  
Amperex Electronic Corporation  
Hicksville, N. Y.

NUMEROUS components for products made by Amperex Electronic Corporation, Hicksville, New York, are fabricated to excellent advantage on light Denison hydraulic Multipresses. Several such parts, typical of the range in size and shape, appear in figure 1.

Most of the smaller ones are produced by two such presses of 8-ton size and the larger parts on a press of 35-ton size. In most cases, runs in our plant are of short duration; because we do not undertake large quantity production, die changes are frequent. One of the advantages of the hydraulic presses is that dies can be changed quickly. As the stroke is variable, setup is quicker than for fixed stroke mechanical presses.

In the 35-ton press, figure 2, for example, the die set-up for drawing a 6x1½-inch cup from a 0.030-inch circular blank of Kovar (a special alloy steel for electronic applications) takes only a few moments.

*They perform blanking, piercing, forming, drawing and even broaching operations on steel and nonferrous materials, yielding parts of widely varying size and shape.*

Kovar is not easy to draw but the draw is made readily in this press because the pressure required and the rate at which it is applied are easily set to the values found by experiment to be best for the job. This is in marked contrast with mechanical presses that have a fixed stroke and speed and strike a sharp blow as the punch contacts the blank.

Parts of nonferrous material are also drawn. One such part is the brass hat-shaped one at top center in figure 1. This requires three draw operations, including one reverse draw to produce the annular recess between the "crown"

and the "brim." Copper is also drawn, one part having the dished shape shown at top right, figure 1.

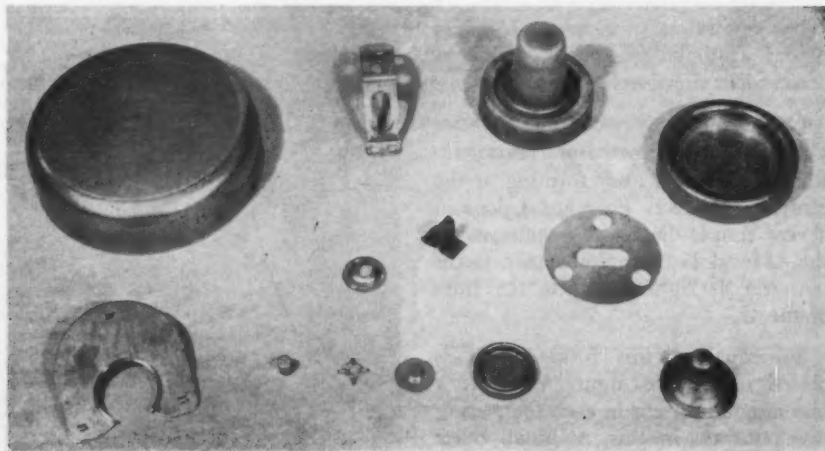
Adaptability to unusual jobs on one of the smaller presses is indicated by the setup shown in figure 3. This involves broaching a hole through the lower portion of a copper cylinder the upper part of which has an oblong cavity hobbled in a prior operation. Below the oblong hole is a circular hole which the broach converts to one having two flat sides  $\frac{1}{2}$  inch apart joining two semi-circular ends spaced about  $\frac{3}{8}$  inch apart.

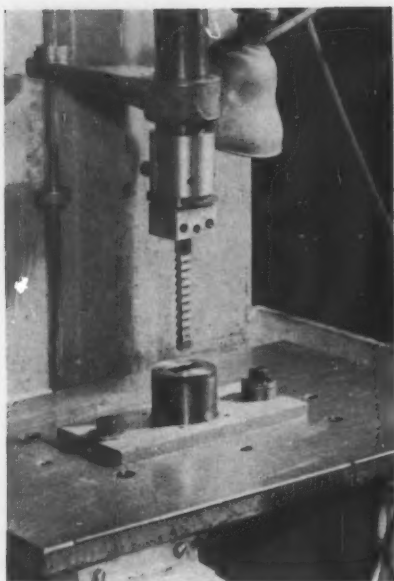
In general, such broaching would be done on a special broaching machine but it is done just as well in the press because its ram, equipped with a holder that fits the shank of the broach, is advanced at the precise and uniform slow speed best adapted to making this particular broaching cut. When the broach completes its cut, it drops into a box below and is set by hand in the



6x1½-inch cup of Kovar, a special alloy steel for electronic applications, produced readily in the die shown in a 35-ton press, even though this alloy is considered hard to draw.

Stampings ranging in size from 6 inches to a fraction of an inch produced effectively by Ampere Electronic Corporation.





Using an 8-ton press for broaching, the tool being forced through a circular hole in a copper cylinder having an oblong hobbled recess. Cutting is done at the slow speed required in this work.

holder again before the next piece is centered in the simple fixture.

One of the many parts fabricated is a U-shaped part formed from brass strip stock and shown after forming at the center of figure 1. Forming is done in a very simple die that not only makes the U-bend but simultaneously forms two feet at right angles to the sides of the U.

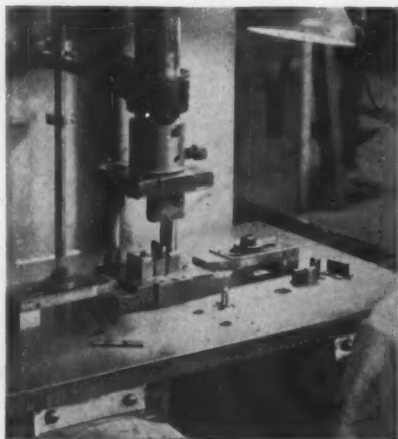
Subsequently, this formed part is placed in the die, figure 4, where a fastening slot is cut in each foot, using two punches. In this, as in all other

work of the three presses, the operator must place both hands on control levers that must be moved one with each hand.

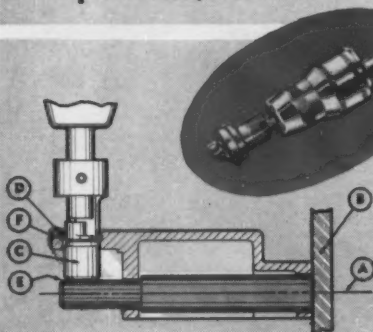
A few of the other small parts made by the 8-ton presses appear in figure 1. Most of these are drawn and the small flanged "hat" (bottom row center) is subsequently pierced, formed and trimmed to produce the starlike stamping next in this row. This includes a ring which is part of the drawn portion, integral with four radial arms. This stamping indicates how, by applying proper dies and using the proper pressure and speed of stroke without shock, even quite difficult and somewhat fragile stampings are made successfully.

The End

This light hydraulic press does blanking, piercing, forming and drawing operations on many small parts. In the die here shown, fastening slots are cut in feet of a U-shaped brass part previously formed in another die.

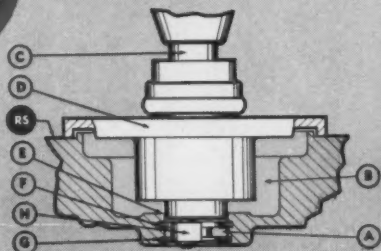


## Waldes Truarc grooving tool solves tough internal grooving problems, cuts costs in assembly-line production



### Problem: Locating a Groove from Centerline of a Hole A.

Workpiece is fitted into plug on fixture plate B. Bottom adaptor C on standard Waldes Truarc Grooving Tool is piloted into bore D and registers on side of plug E. Groove F is cut in exact location required.



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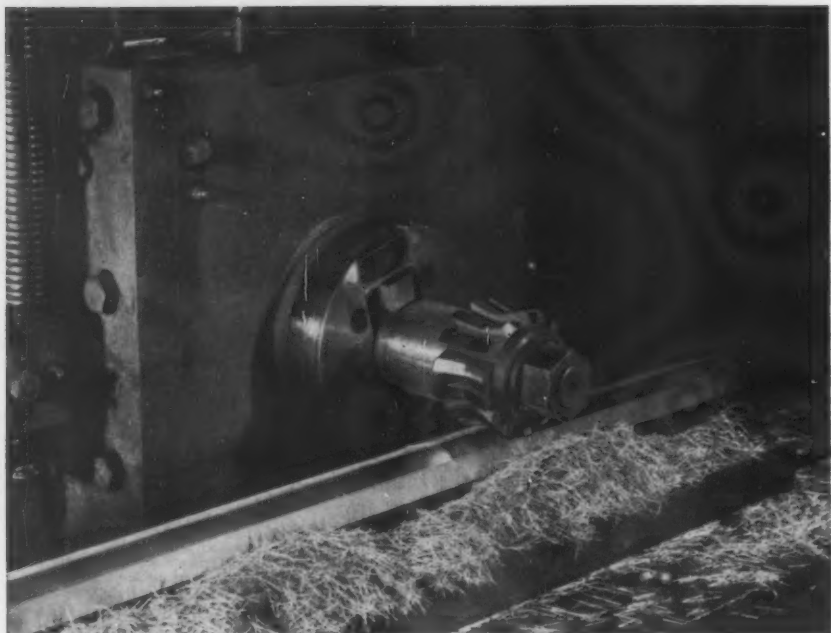
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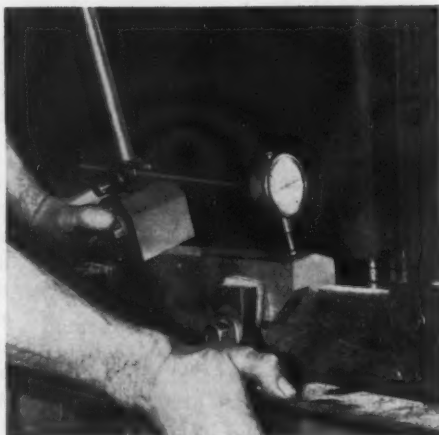
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# Foremanship Forum



## Messenger Boy, Policeman, or Leader?

If a company's policy regarding supervision is one of multiple management, the supervisor will play a far different role from that of the supervisor whose company's top management is of an autocratic nature.

From the attitude of top management toward leadership come differing points of view, e.g., the foreman may be regarded as a messenger boy; his role may be that of policeman; or he may take his proper place as a leader.

Instead of rejecting the point of view of top management, the wise foreman is realistic, and knows that changing the prevailing concept of supervision is largely up to him. Through his handling of his problems he can prove that his job is more than merely carrying messages or policing.

The foreman who is regarded as a messenger boy is expected to do what

he is told in the way in which he is told to do it. He slides out from under the responsibility of managing his department either by aligning himself with top management and giving autocratic orders or by aligning himself with the workers and widening the rift between management and labor.

The messenger boy type of foreman may become too unassuming and placating when dealing with those above him and vague, indefinite and unwilling to go on record about even the simplest matter with his associates and employees. His manner may become ingratiating on the one hand or brusque on the other, depending upon whether he is receiving or delivering a message.

Unhappy employee relations result when the foreman has too little authority. The workers have no respect for him; they are apt to despise him as a

---

A condensation of a chapter from **The Foreman in Manpower Management**, written by **Lillian M. Gilbreth**, this month's "Leaders of Thought" interviewee, and **Alice Rice Cook**, consultant in employee relations. The book was published in 1947 by McGraw-Hill Book Company, Inc.

carrier of tales, unable to stand on his own feet, a door mat. As a matter of fact, management itself is seldom satisfied with this type of foreman. Sooner or later it tires of measuring his success by his never being where he isn't supposed to be, keeping his mouth shut, never giving any suggestions, trotting hither and yon on tireless legs, and having a skin that nothing can penetrate.

Many men, however, who have been assigned to be messengers by management interpret their work constructively and expand it as far as they can, within the framework that management sets. If their techniques of communication and cooperation are good, they may get results that theoretically could not be expected from the opportunities given them.

The foreman who is unfortunate enough to be considered merely a messenger boy has to convince management that his job implies much more than messenger service and that he is able to do the larger job. He must make it clear, however, that he recognizes that he is the channel through which instructions flow to the worker and through which worker reactions return to management. This may be the first step toward wider opportunity.

The policeman type of foreman is used by management to enforce policy and keep up production. His criterion of success is the amount of production achieved, without relation to values other than those of money, materials, machines, and methods. This second-hand authority rather than authority growing out of a position is apt to result in unpleasant characteristics. This foreman's attitude is that he is independent of other people's opinions and does not need their approval. He be-

comes intolerant of any deviation from what he considers the right way of doing things and of people who differ from him in race or opinions. Instead of speaking in a hesitating way, as does the messenger type, the policeman type rants and raves so even those in the next department know when he is on a rampage.

The usual reactions of employees to this kind of foreman are lessened confidence, resentment, and a lack of a feeling of individual responsibility. Certainly no assistant foreman can develop leadership qualities under the supervision of a man whose only job is to preserve order and get the work out.

The foreman who is looked on by top management as a policeman may be successful in changing this point of view. He must convince those above him that, though he recognizes that production is one of the most important parts of his job, there are methods other than autocratic rule for achieving this end. He must present the details of what he thinks is adequate foremanship persuasively and convincingly.

Now we turn to the foreman whose job is defined by top management as that of a leader. He is not only the representative of management and expected to enforce company policy but also a human being in his own right. He is the representative of management in the work situation and also the representative of the worker in the latter's relation to the company. For the sake of management, the worker, and the foreman himself, his abilities and potentialities must be utilized to the fullest extent.

In carrying out the responsibilities of leadership, the foreman emphasizes equally all three functions of his job—

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personnel, production, and instruction. Being a leader is a continuous job and demands his full time and energy. Chosen by top management for his qualities of leadership, he loses no opportunity to demonstrate his competence. This means a strengthening rather than a weakening of his functions as a liaison person. Between his department and top management and his responsibility toward production, without an understanding of the human element and the relations involved in supervision the foreman can do at best only a robot job.

As a basis for such understanding the foreman will want to draw up or check over his own job analysis in the light of such leadership responsibilities as the following: (1) building attitudes; (2) carrying out and interpreting policies; (3) initiating and carrying through activities; (4) representing the company.

1. Top management expects the foreman to be a morale builder. One of the greatest morale factors is loyalty to a common goal. When both foreman and worker feel that they are engaged in doing something larger than their own job, their satisfaction grows. Mere loyalty to a person can never take the place of loyalty to a common goal. Possession of facts, both by the foreman and the workers, is necessary here as a bulwark in maintaining true loyalty.

Personality factors are also most important. The foreman's ability to inspire enthusiasm and to present a case convincingly enables the foreman and worker to gain loyalty to the common goal and to each other. This loyalty includes faith in the leadership of top management. Real loyalty results in cooperation. Out of the attitude of cooperation grow the other desirable at-

titudes of personal effectiveness and emotional stability. The foreman finds himself a teacher of attitudes and an example of putting these attitudes into effect. As he cheerfully cooperates with orders from above and adapts himself to necessary changes, so the workers take the disciplines and controls involved in the job in their stride. These disciplines and controls should be regarded, not as causes for tension and irritability, but rather as helps toward balance and poise.

2. The foreman is expected to carry out and interpret company policies. This responsibility demands the use of clear, forceful language, the art of persuasion, an understanding of individual differences, and a knowledge of the facts involved.

While the foreman is supposed to carry out the company policies as they are given to him, he has a better chance than anyone up the line to see these policies in action and to learn the workers' reactions to them. In his capacity of channeling material back to top management, he may be able to suggest changes or amplifications that will make the policies more easily understood and accepted. If the policies work well, this too should be channeled to top management and may prove a valuable and needed reassurance.

3. The foreman initiates and carries through activities. All the resources of effective production and personnel relations techniques should be known to him and utilized to the full. As much as possible, he should free himself of all noncreative work.

One of the best ways of testing the level of morale is through personal contact with employees. The foreman who makes certain that he has some

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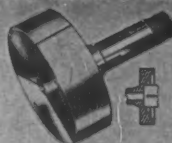
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type of contact with each member of his department every day is in a strategic position. The reason for or the content of the contact is much less important than the fact of the contact itself and the foreman's discovering exactly the worker's state in respect to morale. The cumulative result of such a survey forms a fairly trustworthy barometer.

Having gained such a weather report of departmental conditions, the foreman is ready to try to discover immediate and underlying causes. When good production methods are supplemented by good human relations, the result can only be positive.

4. The foreman represents the company both inside and outside the plant. This function gives him a chance to practice his public relations techniques. He must have facts and figures available. Representing the company is one of his functions that he takes care to share with his employees. The more each person in the department identifies himself with the company, the greater interest he has in its success.

After examining his job analysis, the foreman will realize more than ever the leadership demands involved in his position. He will want to match these specifications with a personal appraisal.

The foreman is really four leaders in one—the leader he thinks he is, the leader he wishes he were, the leader other people think he is, the leader he thinks that other people think he is. From each angle he can gain help, but it is the wise foreman who unifies these pictures into a realistic, objective single picture and remembers that after all he is one person.

The foreman should ask himself the question, 'Am I growing in my ability to lead?' There is nothing static in

this business of leadership. The leader is always in the process of becoming more effective or less effective in the handling of relationships and situations.

The next question may well be, 'Are my leadership techniques effective with various groups?' It is necessary that the foreman be able to determine just what point the group has reached in its understanding of the problem to be faced and how he can best appeal to each person in the group and help him to understand and cooperate.

Another question is, 'Am I encouraging those around me to become leaders themselves?' The measure of his leadership may well be the number of leaders the foreman develops. Too often the natural leaders in a department use their abilities to cause trouble, for they are given no constructive outlet. In many departments there is an immense store of wasted leadership energy waiting for the supervisor to provide appropriate channels.

Of great importance is the question, 'Is the entire department becoming more self-sustaining?' A self-sustaining department is one in which the responsibilities of leadership can be picked up at any level. A clearly defined line of leadership, plus a willingness to recognize the necessity of emergency leadership, makes a department self-sustaining.

The foreman may find that some of these personal specifications are out of line with those of his job analysis. The tackling of each of these points individually can form the basis for a personalized, self-administered course in supervision. Such a procedure is much more sure of success if one point is worked on at a time.

**The End**

*Save Costly  
Regrinding!*

**Anderson  
NEW, IMPROVED  
HAND SCRAPER**

After the original regrinding most users of this new Anderson hand scraper find that only honing is necessary. Judge for yourself: Order as many Model 5-D scrapers as you want. We'll send them promptly. Use them a full week... if they don't live up to all your expectations, send them back to us for refund.

**Faster Cutting  
Easier to Use  
Just the Right Spring  
Palm Fitting Grip  
Light in Weight  
18" — 20" — 22" lengths**

**\$5.80... with high speed  
steel blades**

**\$8.50... with carbide-  
tipped blades**

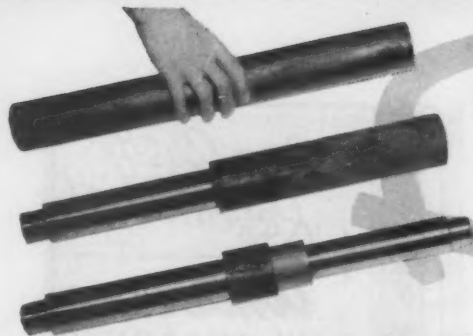
**\$1.50... for rubber bumper  
shown below**

**ORDER AS MANY AS YOU NEED  
MONEY-BACK GUARANTEE**

Indicate choice of high-speed steel or carbide-tipped blades, and 18", 20", or 22" lengths. We suggest you include rubber bumpers in your order. Write today

*For Bulletin No. 3-5*

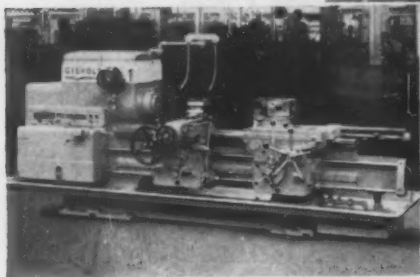
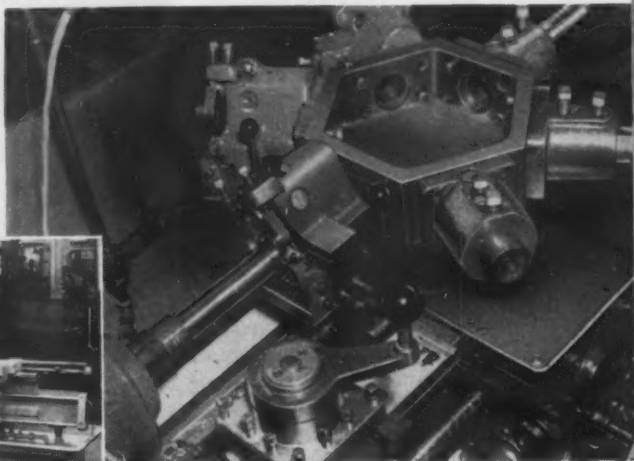
**ANDERSON  
BROS. MFG. CO.  
1907 Kishwaukee St.  
ROCKFORD  
ILLINOIS**



*take shaft jobs  
Like This:*

## they take less time on **GISHOLT TURRET LATHES**

*Yes, even in lots as small as  
5 or 10 parts, you can't beat  
turret lathes on this kind  
of work. Parts are machined  
complete in 2 operations—  
total time is less than 4 min.*



### **no extra equipment needed!**

With no more than your standard bar equipment, you're all set to cut machining costs on shafts like these. No previous operations . . . such as cutting to length or centering . . . are necessary. And with *two or more* tools from turret and side carriage, you have the basic advantage of turret lathe economy—the time saving that means lower costs.

Before you turn to extra equipment or special attachments, look into the possibilities of doing the job the quick and easy way on Gisholt Turret Lathes. Gisholt engineers will gladly help you.



THE GISHOLT ROUND TABLE represents the collective experience of specialists in the machining, surface-finishing and balancing of round and partly round parts. Your problems are welcomed here.



**TURRET LATHES • AUTOMATIC LATHES  
SUPERFINISHERS • BALANCERS  
SPECIAL MACHINES**

**GISHOLT MACHINE COMPANY**  
MADISON 10, WISCONSIN

# BLUE BOOK'S Know How Reference Sheets

## Use and Care of Carbide Tipped Drills

To obtain maximum efficiency from carbide tipped drills it is imperative that they be properly operated and reground.

## Speeds and Feeds

For the most part run these drills at higher speeds and lighter feeds than those of high speed steel drills. Especially in sizes over 1/2" dia., the speed should never be under the maximum speed recommended for high speed steel drills. For best results, a slightly lower feed rate with the higher speed is recommended. Use machine feeds for all materials except hardened steel, which requires the use of a hand feed.

Optimum speeds for drilling cast iron are approximately 115 to 140 fpm, feeds two-thirds that of high speed drills. When drilling other non-ferrous materials, you may often be able to further increase drill speeds, providing machine conditions are good and there is no vibration or end play.

## Bushings

For centering and supporting the carbide drills, guide bushings are highly recommended. Use of a coolant may cause cracking of the carbide tips unless extreme care is exercised in its application.

## Regrinding

For accuracy and long life, carbide tipped drills should be repointed by machine methods if at all possible. A 118° included angle point with a lip relief of approximately 10° to 12° is customary. A smaller included angle shortens regrind life of the tips. To maintain the original web thickness at the point, it is usually advisable to nick the web after repointing; thickness should be kept between 10% and 12% of the drill diameter.

For repointing, use a resinoid bond diamond wheel of 180 to 220 grit. Silicon-carbide wheels have a tendency to cause flaked cutting edges.

Never allow the drill to run after the edges dull. Breakage will result from excessive dullness of the point.

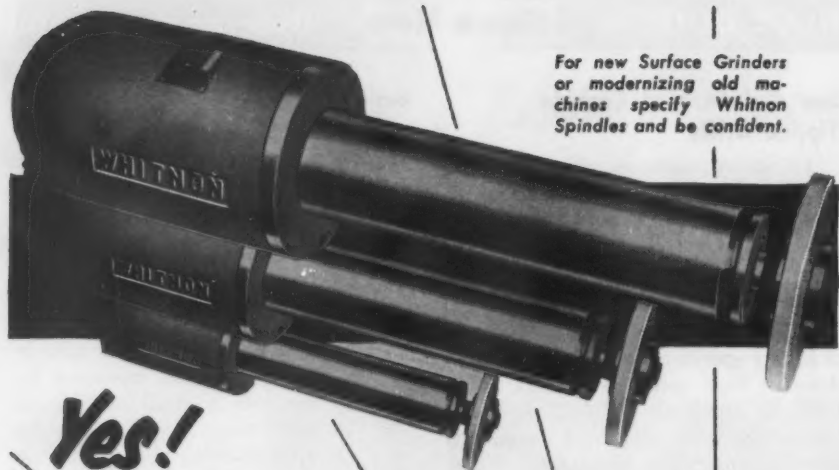
Carbide Drilling Feeds in Inches Per Revolution

Drill Diameter, Inches	Feed
1/8 to 3/16 .....	.002 to .004
1/4 to 5/16 .....	.003 to .005
3/8 to 7/16 .....	.004 to .008
1/2 to 11/16 .....	.006 to .010
3/4 to 1 .....	.008 to .012

Carbide Drilling Speeds in Surface Feet Per Minute

Material	Drill Diameter, Inches	Speed
Nonferrous alloys .....		150-200
Cast Iron (soft) .....	1/8 to 7/16	90-165
Cast Iron (soft) .....	9/16 to 1	90-125
Cast Iron (soft) .....	1 or more	125
Cast Iron (chilled) .....		30
Plastic (phenolic, etc.) .....		100
Plastic (glass-bonded) .....		50
Wood .....		200

Use the lower feed values for the smaller drills in the range, or for harder materials.



For new Surface Grinders  
or modernizing old ma-  
chines specify Whitton  
Spindles and be confident.

**Yes!**

**THOUSANDS OF MACHINISTS IN ALL SIZE  
PLANTS PREFER PRECISION HIGH PRODUCTION**

## *Whitton* **SPINDLES**

Whitton Surface Grinder Spindles are precision made for faster stock removal and finer finishes . . . Ideal for the most unusual grinding applications. Whitton Spindles are dynamically balanced as a complete assembly—skillfully lubricated to guarantee long life under most adverse conditions. Heavy spring pre-loading prevents all endwise motion or deflection of the rugged alloy shaft.

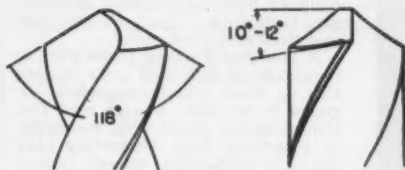
SEAL OF  
**CONFIDENCE**  
IN WHITTON



THE *Whitton* MANUFACTURING COMPANY  
New Britain Avenue and Route 6 Farmington, Connecticut



**WEB THINNING**



**POINT ANGLES**

A much lesser wear land is allowed on the carbide cutting lip edge than would be permissible on high speed drills.

## Use and Care of Carbide Tipped Reamers

A few special considerations should be given to carbide tipped reamers. These are outlined below.

### Speeds

Use lower surface and speeds with reamers than with other carbide tools. In reaming, the size of the hole limits the cross-section of the tool, and usually considerable overhang is required. Both of these result in a loss of rigidity, which is essential with very high surface speeds if chatter is to be avoided.

Carbide tipped reamers cannot stand even a momentary chatter at the start of a hole, as such a vibration is likely to chip the cutting edges. Consequently, the primary consideration in selecting a speed is to **STAY LOW**

**ENOUGH TO ELIMINATE ALL CHATTER.**

### Feeds

Use as high a feed as possible while still producing the required finish and accuracy. Reaming feeds are usually higher than those used for drilling. A good starting point would be between .0015" and .004" per flute per revolution. Glazing, excessive wear, and chatter may result from too low a feed. Too high a feed tends to reduce the accuracy of the hole; finish may also be of a lower quality.

### Stock Removal

Insufficient stock for reaming may result in a burnishing rather than a cutting action. Determining factors are type of material, feed, finish required, depth of hole, and chip capacity of the reamer. For machine reaming, try .010" on a 1/4" hole, .015" on a 1/2" hole, up to .025" on 1 1/2" hole. For hand reaming, stock allowances are much smaller. A common allowance is .001" to .003".

### Rigidity

Carbide reamers should be well supported with a minimum of overhang. A momentary vibration resulting from a lack of rigidity in the setup may cause flaking and chipping of the carbide tips.

### CAUTION

It is **extremely important** to prevent these conditions:

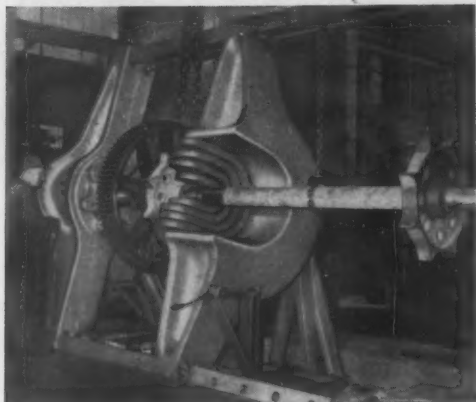
1. Misalignment of any two or more parts of the setup.
2. Bottoming in blind holes.
3. Entering work too fast.
4. Chattering of reamer.
5. Lack of rigidity in machine or work holder.

Data through courtesy of Cleveland Twist Drill Co., Cleveland, Ohio.



# A MOUNTAIN *of* POWER

—or a touch  
of pressure



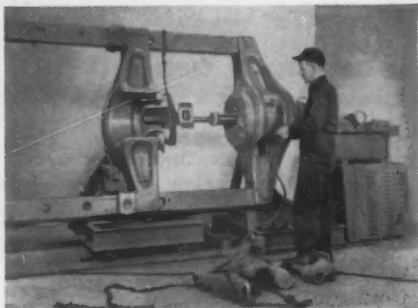
**POWER FOR BIG JOBS**—Here a Rodgers 600-Ton Inclined Forcing Press is forcing a large gear and sprocket from a mine machine shaft.

The heavy machines and equipment used in the great iron mining industry present a variety of problems when repair or maintenance is necessary. For this work the accurately controlled action of Rodgers Hydraulic Forcing Presses is a real time and work saver.

A Rodgers Forcing Press puts a mountain of power at your fingertips to force wheels, sprockets or gears from their shafts and for straightening, assembling, swedging or upsetting jobs. Operators also use the versatility, speed, power and positive control of a Rodgers Forcing Press to efficiently perform small pressing and forcing jobs with just a touch of pressure—tasks once done only on vertical shop presses!

## *you get both with* **RODGERS FORCING PRESSES**

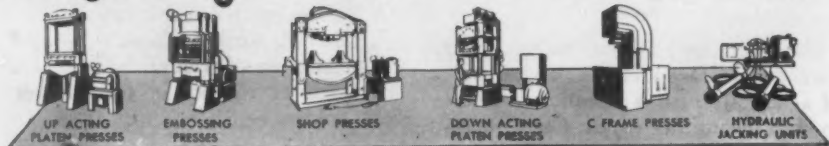
Rodgers vertical, horizontal and inclined forcing presses offer capacities from 100 to 600 tons . . . up to 9 feet between tension bars . . . up to 16 feet between ram and abutment . . . single or double acting cylinders with 13 or 26-inch ram travel (72-inch travel available) . . . electrically powered hydraulic pumps with selective, positive pressure adjustment and remote control . . . removable press cylinders that can be used in special jacking or pulling jobs . . . and many more features that assure you of dependable, long life operation—all fully described in Rodgers Catalog Number 315A.



**LIGHT TOUCH FOR SMALL JOBS**—This Rodgers 300-Ton Inclined Forcing Press is used on small as well as large equipment repairs. Here, a pin is being pressed out of a tractor idler support bracket.

*Write for it today!*

**Rodgers Hydraulic Inc.** 7453 Walker St., Minneapolis 16, Minn.



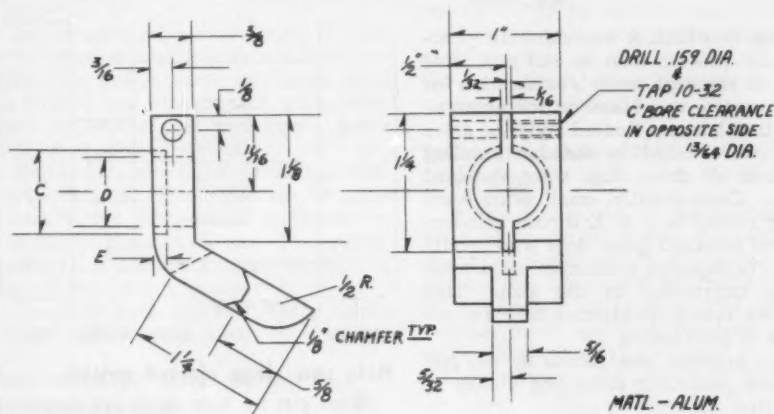
# Shop HINTS



## All Drive Dogs Are Not Standard Tools

by Harold D. Rhodenbaugh

In experimental and small machine shops the drive dog problem can be troublesome and somewhat expensive. Recently this writer had contact with



BLANK NO. T-35778

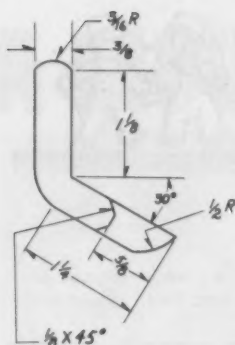
SEE NOTE

DRIVE DOG - J&L TH'D. GRINDER

TOOL NUMBER	C	D	E
T-35778-01	.721	.500	.110
T-35778-02	.638	.500	.110

### NOTES:

BLANK # T-35778 IS STOCKED IN QUANTITY IN TOOL CRIB TO ORIGINATE A "DOG" SUPPLY DATA COVERING DIMS -C-D TO STD. TOOL CO'ORDINATOR & A DASH NUMBER WILL BE ASSIGNED & THE DOG WILL BE MADE - ANY OTHER PAPER WORK IS UNNECESSARY.



CASTING—  
DRIVE DOG BLANK  
MATL.—ALUM.

a shop in which it was standard practice for process men to call out drive dogs as standard tools. Justification for this practice was based on the assumption that because limited styles of drive dogs were listed in standard tooling catalogs all drive dogs were standard items. Consequently, small gears were being routed to J & L thread grinders and no standard grind dogs were available. To expedite production dogs were being improvised in the shop. This practice retards production and the expense is prohibitive.

This problem was solved by designing and producing drive dog blanks in quantity.

By using these blanks, a sizable quantity of various size grind dogs can be produced upon short notice at minimum cost.

### Suggestion for laying out

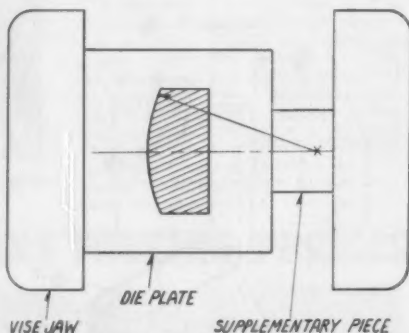
by Federico Strasser

Toolmakers often have to solve small or great problems concerned with their trade. Here follows the explanation of a simple means which facilitates the laying out of some special work-piece.

In a die-plate the blanking opening outline also contained an arc with such a great radius that the center was outside of the die-plate. In order to solve the problem, I took a flat piece of

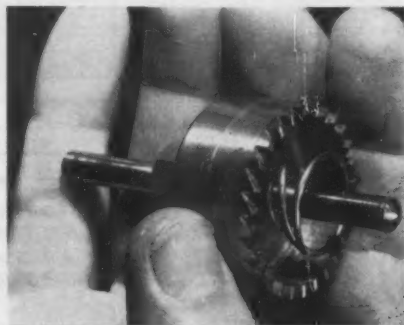
planed steel and clamped in a vise both the die-plate and the supplementary piece.

The opportunely drawn center line, necessary in the first place for the original laying out, is very useful, because it often happens that during the working out of the die-opening the lines become somewhat blurred, and one must go over them again. In such cases said center line—drawn on both the die-plate and the supplementary steel-piece—helps to a quick and correct re-location between them, of the two work-pieces.



### Hole saw slugs ejected quickly

Slugs cut by hole saws are disposed of neatly and quickly at Temco Aircraft Corporation, Dallas, Tex. A steel spring, attached to the hole saw pilot, serves as an automatic ejector. It saves



the operator 2 to 3 minutes a hole by saving him the job of cleaning out packed slug material.

This material usually is laminated Fiberglass. Hole saws are used to make circular cut-outs in Fiberglass aircraft battery boxes. Slugs formerly were packed so tight that operators often had to disassemble hole saws from the hand drills that power them in order to clean the cup-shaped blades.

Plastics Fabricator Frank P. Rose, Jr., hit on the steel spring ejector idea. His solution was so simple that he was able to use it a few hours after he first thought of it.

He wrapped a 3½-inch length of steel wire twice around the ½-inch hole saw pilot. He pulled these two loops tight to secure the wire on the pilot, then bent the rest of the wire into a four-coil, cone-shaped spring.

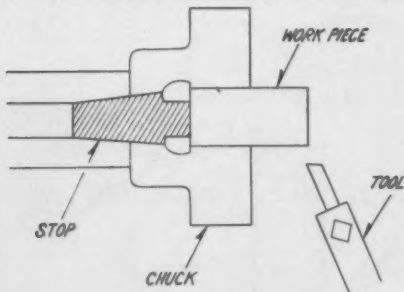
The spring compresses as the hole saw makes its cut. When the cut is complete, spring pressure is sufficient to pop the slug out of the saw. The spring, however, is anchored tightly enough to the pilot to stay in place.

Designer Rose said his ejector works on hole saws of all sizes.

### Suggestion for lathe work

by Federico Strasser

We often have to produce short round work-pieces (4" to 6" length) with rather small length-tolerances. In order to do it economically and quickly we devised the following process which



gave excellent results:

(1) Cut the pieces to approximate length with a power hack saw.

(2) Turned one face of the work-pieces.

(3) Put into the "nose" of the lathe a previously made flat-nosed stop (with correct Morse-tapered shank) made from steel, hardened and ground.

(4) Chucked the work-piece so that its turned face should contact firmly against the stop.

(5) Turned the free face of the work-piece, taking care that the last cut should be made always with the same setting of the compound-rest.

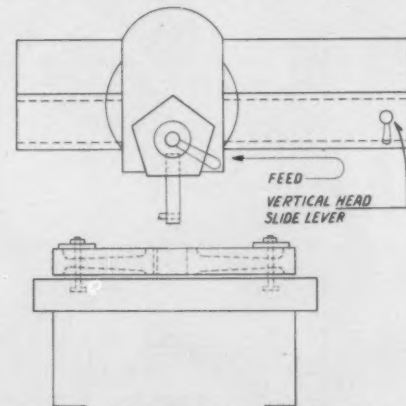
(For greater accuracy, the compound rest is set at a small angle so that the actual feed be less than the micrometer-collar-reading.)

### Splining on Boring Mill

by W. C. Betz

In the machining of large pulleys, we were confronted with the problem of cutting the keyways. The boring and turning was done on a 36" Bullard mill so we made a splining tool to fit the vertical turret and used the head slide to provide travel for the tool.

Cuts must be comparatively light or



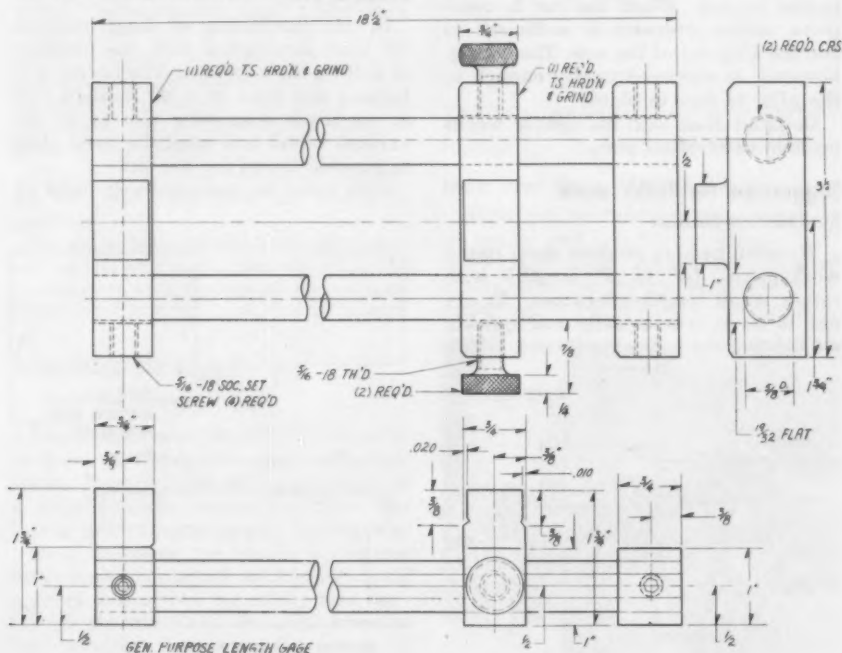
SPLINING ON BULLARD LATHE

**Jumping out dies is another job that can be done on these machines. Clearance may be provided by setting the head slide to the angle required.**

## by Harold D. Rhodenbaugh

This is a sturdy length gage universal in application in lengths up to any reasonable length you wish to make. Once this gage is set a machine operator can check the length of a shaft, bar, or tube in a fraction of the time usually required with precision instruments and do it just as well.

Verniers are expensive, accurate instruments not usually found in abundance in the average shop, yet they have their applications, and one of those





# Logan RFL unit

**Keeps Your Air-Operated Equipment  
Working At Full Capacity**

**MAINTAINS UNIFORM AIR PRESSURE, FILTERS AIR,  
LUBRICATES AIR CYLINDERS, VALVES, TOOLS**

## WHAT IT DOES

To assure capacity performance under all conditions, install the new Logan "R-F-L Unit" wherever air power is used in your plant and on the equipment you are marketing. Uniform working pressure is maintained by leveling out surges and sudden drops in the air supply. Clean, moisture-free, oiled air is supplied to assure unfailing operation, minimize wear of working parts, and increase service life of packings. The R-F-L Unit is installed in the intake line from the main air line, and can be mounted on a central control panel. Its compact, clean lines harmonize with the modern styling of your latest equipment. All components are conveniently visible on and controlled from the front panel. The upper and center knobs regulate the air pressure and oil flow, respectively—the lower knob drains the water trap.

## FUNCTIONAL FEATURES

- Long life-piston-type reducing valve with long travel for accurate regulation of air pressure. Pressure gauge.
- Lubricator with control knob, oil level sight glass and filler plug located on front panel of unit.
- Removable ribbon-type air filter element to trap scale, rust, other foreign matter and water. Large water reservoir.

**REGULATOR**—Piston-type reducing valve with long travel of control permits accurate regulation of pressure from main air line as required by work. Keeps working pressure uniform with minimum air consumption.

**FILTER**—Supplies clean, dry air to system, thus assuring uniform and trouble-free operation. Replaceable filter element separates scale, rust and other foreign matter from air. Moisture drips into a reservoir which requires draining only once or twice a week.

**LUBRICATOR**—Automatically injects oil into air intake line to lubricate valves and cylinders, prevent corrosion and increase life of parts and packing. Metering needle adjustable as required by installation.

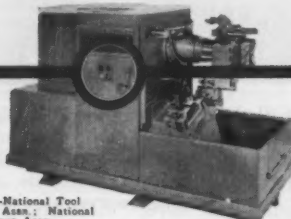
*Eliminates piping, elbows, tees and reducers between components. No pipe friction.*

## NOW IT IS CONTROLLED

Two knobs on front panel accurately regulate air pressure and amount of oil injected as required by the individual job.

## NOW IT IS INSTALLED

Install in the air intake line from the main air line. Can be mounted on a central control panel.



Member—National Tool  
Builders Ass'n. National  
Fluid Power Ass'n.

Illustrated—Single  
spindle automatic  
chucking machine  
with Logan R-F-L  
Unit installation.  
Photo courtesy  
Warner & Swasey Co.

# Logan



**LOGANSFORD MACHINE CO., INC.  
803 CENTER AVE., LOGANSFORD, IND.**

*Let Logan engineers help you design your  
Air and Hydraulic Circuits. No obligation.*

AIR CONTROL VALVES, Cat. 100-4 • AIR CHUCKS, Cat. 70-1 • AIR CYLINDERS, Cat. 100-1 • AIR-HYDRAULIC CYLINDERS, Cat. 100-3  
AIR and HYDRAULIC PRESSES, Cat. 51 • COLLET GRIP TUBE FITTINGS, Cat. 200-5 • HYDRAULIC CONTROL VALVES, Cat. 200-4  
HYDRAULIC CYLINDERS, Cat. 200-2, 200-3 • HYDRAULIC POWER UNITS, Cat. 200-1 • SURE-FLOW COOLANT PUMPS, Cat. 62





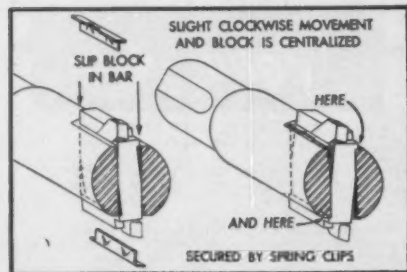
### Quick-Change Boring Blocks for Roughing, Semi-Finishing, Reaming

These interchangeable blocks are quick inserting, self-centering, positive locking in the boring bar without locating holes or screws. Just slip the block into the slot of the bar and engage the projecting lugs to the ground flats on the bar. It is then perfectly centered. A pair of spring clips hold the block in place (see below).

The fully adjustable blades are pre-set to size. Standard blocks run  $1\frac{1}{4}$ " to  $7\frac{3}{4}$ " diameter, larger sizes are made to order. Blades are highspeed steel, cast alloy, or carbide tipped.

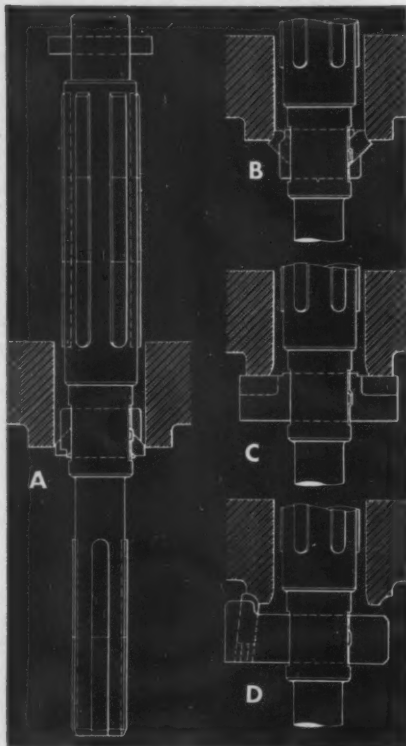
Bars, not weakened by locating holes, withstand the strain of heavy cutting. Ends of each slot are ground after hardening to take the cutting thrust of the blocks, provide rigid support.

The features of Gairing Boring Blocks have made many unique applications possible.



### Unusual Production Job Made Possible by Quick-Change Feature

After forward stroke boring, using standard boring block (A), three other operations were performed alternately on the backward stroke of the spindle. Standard block with specially ground blades (B) and special blocks (C, D) use the same slot in the bar.



For full data on Standard Blocks and Bars, many more examples of production applications, see the Gairing Boring Tool Catalog. Write us, or call your local Gairing representative.

### THE GAIRING TOOL COMPANY

Tooling—Standard and Special

21228 Hoover Road Detroit 32, Michigan

## MODERN TOOLS

in  
ACTION

### Blade retention raceways ground by New double spindle, vertical grinder

Built by the Frauenthal Division, The Kaydon Engineering Corporation, a new double spindle, vertical grinder used in grinding blade retention raceways in the hubs of Turbo-Hydromatic propellers, was installed recently at Hamilton-Standard, Division of United Aircraft Corporation, Windsor Locks, Conn.

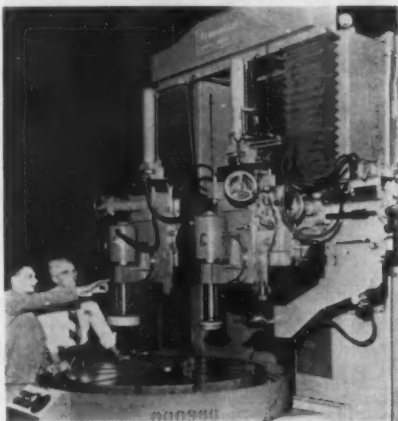
The new machine was designed to facilitate grinding of the large Turbo-Hydromatic hubs in the vertical position since the weight and mass of the hub and fixture rendered conventional grinding equipment inadequate. Accuracies of diameters, vertical center distance and concentricity within .00020 are readily obtainable. Unique hydraulically actuated contour forming wheel dressers and a turret stop device to control raceway positioning are included in the special equipment designed for this application.

The floor-mounted machine features individual power units. The rotary table drive unit is a DC variable speed motor (M.G. set) with speed control located in the main control station at the front of the machine. Power transmittal is by "timing belt" drive from the DC motor to the table spindle unit, which has an integral bearing pulley assembly carrying the radial thrust of the drive.

Grinding spindles are of the direct connected type with reversing control and interlocks to the rail elevating controls. All compound movements—reciprocating, feed and rapid traverse positioning, are by hydraulic actuation.

This is the largest floor mounted machine built by the Frauenthal Division and the vendor points out that this model is ideally suited to tool and die room applications.

E. M. Bancroft, left, Hamilton-Standard's chief tool engineer and machine demonstration foreman Vincent Olsen, inspect the new double spindle, vertical grinder.



## **Modern Tools Cont'd.**

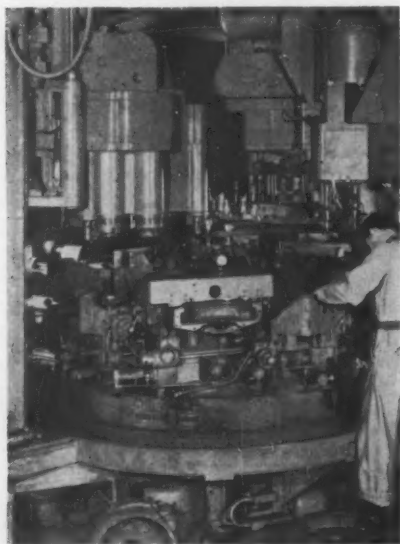
### **Three special machines used by Packard Motors**

Three special purpose machine tools manufactured by Baker Brothers, Inc., Toledo, played an important part in the production of the 1955 line of Packard motor cars.

The three machines, all with new automatic features, are a differential carrier machine, a crankshaft drilling machine, and a flywheel housing finisher.

The first, credited with materially lowering the cost of rear axle pro-

One of three special purpose machines manufactured by Baker Brothers, for the Studebaker-Packard Corporation and used in the manufacture of the new Packard V-8 engines. Designed to finish a rough flywheel housing cover, the machine has a total of seven vertical and horizontal boring and drilling units around a 72-inch diameter, five-station automatic index table. Thirty-seven spindles machine all holes in the sides and top of the housing cover.



duction by Packard, performs the rough bore, semi-finish and finishing operations as well as chamfering and bottoming operations. A double-end trunion-type machine, it bores the differential carrier from opposite directions at the same time to extremely close tolerances. Operation is entirely automatic except for loading and unloading.

The crankshaft unit is also a double-end, trunion-type machine which drills both the transmission flange end and the fan pulley end of the crankshaft used in Packard's new V-8 motors. Indicative of the accuracy required of the machine is the fact that it prepares a dowel hole in the flange end of the crankshaft which pegs the radial location of the shaft when it is ground for finishing. Any variation in the location of this dowel hole would result in an unbalanced crankshaft. The cycle and index of this machine is automatic. Loading and clamping, unclamping and unloading is manual.

The third machine performs all necessary operations to finish the rough flywheel housing cover, including boring, drilling, reaming and tapping operations. It has a total of seven vertical and horizontal boring and drilling units around a 72-inch diameter, five-station automatic index table. A total of 37 spindles are used to machine all holes in the sides and top of the housing cover. Operation is automatic except for loading and unloading. The electronic controls governing the operation are housed in cabinets almost as large as the 80,000-pound machine itself.

### **1070 motor commutators an hour by automatic multi spindle machine**

Calculated at a conservative 85% efficiency, the Bodine automatic, multi-spindle machine turns out 1070 small-motor commutators in a 50-minute hour.

The operations performed on the commutator include (1) hand feeding, (2)

$$5 + 4 = \underline{100\%}$$

*An Announcement of Special Interest to All Metal Cutting Plants  
by the Cincinnati Milling Products Division,  
The Cincinnati Milling Machine Co.*

We are pleased to announce that the addition of four new members to the Cimcool® family of five products now permits us to serve industry 100%.

As you know, it was just a few years ago that we introduced our first cutting fluid, Cimcool Standard Concentrate. Born of 25 years of painstaking research and practical experience, this revolutionary coolant is today the largest selling chemical-lubricant cutting fluid in the world.

In recent years we have added four other products, each one uniquely designed to serve a special purpose in industry: Cimcool Water Conditioner for increased rust control . . . Cimcool Tapping Compound, the magic compound that increases tap life . . . Cimcool S-2 Concentrate for heavy duty use . . . and Cimcool Transparent Grinding Fluid, developed for superior rust control at high dilutions.

These original five members of the Cimcool family served 85% of all metal cutting jobs. However, our goal has not been 85%, but *one hundred per cent*. And now, we have at last reached that goal with the introduction of four new products—which also have been developed in the laboratory and proved on-the-job:

**CIMCUT BASE ADDITIVE**—For those jobs where an oil-base cutting fluid is required.

**CIMCOOL "CI"**—The cutting fluid for cast iron with exceptional rust control properties.

**CIMCOOL MACHINE CLEANER**—2-phase non-corrosive cleaner that cuts grit, dirt, slime, oil.

**CIMCOOL BACTERICIDE**—The most effective agent yet developed to overcome rancidity.

Our representatives will be happy to give you full details about these nine great products now serving industry 100% . . . and to prove to you, through actual demonstration, that Cimcool products *lower costs . . . and do a better job*.

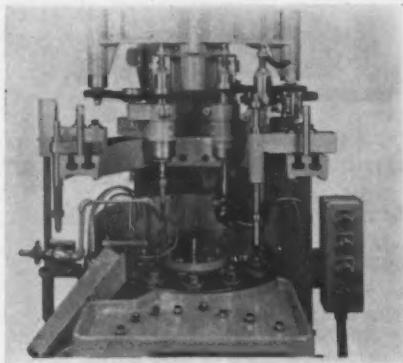
\*Trade Mark Reg. U.S. Pat. Off.

**CIMCOOL**  
**Cutting Fluids**

100%  
for ~~85%~~ of all metal cutting jobs

PRODUCTION-PROVED PRODUCTS OF THE CINCINNATI MILLING MACHINE CO.

### Modern Tools Cont'd.



automatic inspection for positioning, (3) carbide ream center shaft hole in bakelite .3145-.3165 dia., (4) carbide hollow mill on O.D. .691-.693 dia. using piloted hollow mill, (5) carbide face bakelite shoulder piloting in reamed hole, and (6) automatically eject.

The carbide tools maintain high production speeds and longer tool life in extremely abrasive materials. They also maintain close tolerances on machining operations.

While in this instance the Bodine machine (Model 41-20) was tooled as a straight driller, it may also be tooled for tapping, milling, single or double screw inserting, and assembly operations, in any grouping desired. The machine is manufactured by Bodine Corp., 319 Mountain Grove Avenue, Bridgeport, Conn.

### Power vise solves clamping problems at Hills-McCanna

A new power vise installed by the Hills-McCanna Company of Chicago has eliminated a number of production snags caused by manual clamping of castings on a finish grinding job operation. With manual vises, too tight a setting would damage the castings.

Made by the Wilton Tool Mfg. Co.,

925 Wrightwood Ave., Chicago 14, Ill., the Wilt-O-Matic is activated by air, and has a booster that multiplies air pressure and converts it into hydraulic gripping force. The operator can preset the vise to the exact pressure needed to hold castings firmly, without damaging the metal. The operator also can turn work pieces in the vise quickly and easily, by controlling the jaws with the foot pedal, and moving the casting with his free hand. Results of using the Wilt-O-Matic have been a 10% reduction in clamping time, easier, less fatiguing working conditions, and the end of slippage and metal damage problems.



### Changes to power shear for die protection and faster trimming

Improved protection of expensive dies is a bonus benefit achieved by Douglas Aircraft Company in its El Segundo, Calif., plant where many former hand or band saw trimming operations are now being done by a power shear.

Major work for the power shear are drop-hammer forged parts of aluminum alloy, such as the one pictured. Trimming on the Whiting Quickwork Rotary power shear eliminates the burrs and

## Modern Tools Cont'd.



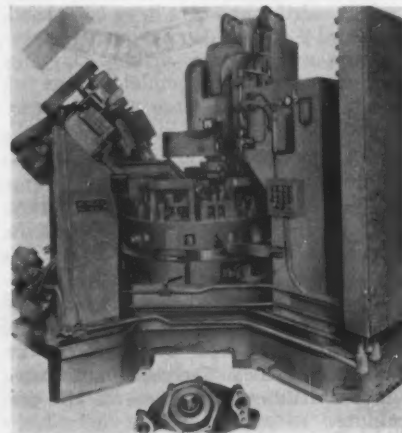
chips common to band saw operation. Previous experience at Douglas showed that the burrs and chips were easily transferred to lead or kirsite drop-hammer dies.

The shear is equipped with a foot control whereby the cutting speed can be varied from a slow creep to the top rated speed of the machine.

The Quickwork Power Shear handles plate or sheet metal up to 1" mild steel and in any shape. It is a product of Whiting Corporation, Harvey, Ill.

### "Angle-Matic" drills, chamfers, spot faces & taps

Michigan Drill Head Co., Dept. MTB, 917 E. 8 Mile Rd., Detroit, Mich., has introduced the Michigan Angle-Matic, which drills, chamfers, spot faces and



taps water pump bodies for one of the new V-8 engines. It performs operations on both top and bottom of the pump body, and drills all the angular holes—by means of a two position hydraulically operated fixture and angular mounted units.

The machine is built around a standard Hydro-20 column assembly. It incorporates a special base and special risers for the horizontal and angular units. A standard Michigan 60" Hydraulic Index Table rotates the fixture, and all tapping is performed by standard Michigan Tapping Units with individual lead screws. It produces 120 water pump bodies per hour.

### Largest stretch-wrap forming machines installed on pacific coast

This Model 60 Hufford Stretch-Wrap Forming Machine is one of the two largest in the world and the only one on the Pacific Coast. Its installation has just been completed at Rohr Aircraft Corporation, Chula Vista, California.

This Model 60, with its 350 tons of stretching capacity, will be put to work producing aircraft components for all air frame manufacturers in the Pacific area.

The machine forms parts from both extruded material and sheets by stretching and simultaneously wrapping the stock around a stationary die. The two large arms are pivoted near the central die location and are wrapped back by means of four huge hydraulic actuating cylinders. Twin barrelled tension cylinders, each exerting 703,720 lbs. of stretch are mounted on the arms. These may be positioned for any desired spacing between the jaws accommodating various work lengths. Jaws for extrusions or sheets are interchangeable.

Its immediate use will include the production of pods, wing tips and aft sections on the B-52 as well as other parts at the direction of the United



### Modern Tools Cont'd.



States Air Force. Considerable work is planned for forming titanium with the possible necessity of hot forming.

It measures approximately 60 feet across the face, stands almost 20 feet high. A pit 7 feet deep in which the machine is assembled was necessary to bring the die area to floor level. Sheet parts can be formed from stock measuring  $31\frac{1}{2}$  feet long by 6 feet wide. The machine is operated by a single man who views the entire forming operation from the control panel.

### Two machines combined with special fixturing

The two machines illustrated are Motch & Merryweather Model OOG Automatic Circular Sawing Machines. The problem solved was to cut from stock a piece  $2\frac{1}{2}$ " in length, with a right-angle (90-degree) cut on one end and a 15-degree angular cut on the opposite end.



The machine in the rear cuts a piece twice the finished length to provide the square ends. A chain-operated conveyor indexes the cut piece to the second loading station on the machine in front. The front machine is positioned at the 15-degree angle and is equipped with angular jaws on a double-acting, self-equalizing vise, which hold the double-length piece during the cutting by a circular saw blade. By cutting the piece in half, the desired end result is a part with a 15-degree angle at one end and a 90-degree angle at the opposite end. Stock is fed automatically to each machine. A stock stop, on each machine, actuates the vise when the stock is pushed against it. The stock stop gauges the lengths to be cut on the respective machines. The sawing cycle begins as soon as the vise has clamped the stock. At 100% efficiency 89 cuts per hour are possible, in this case, on c-1118 hot rolled steel,  $1\frac{1}{2}$ " x  $2\frac{1}{2}$ ".

Designed and manufactured by The Motch & Merryweather Machinery Co., 888 East 70th Street, Cleveland 3, Ohio.

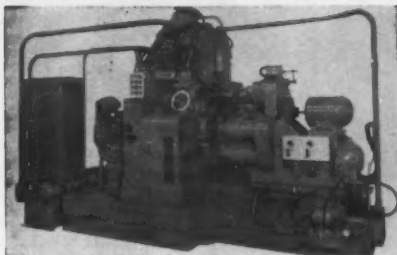
### Drum-type machine drills at the rate of 12" per minute

BarnesdrIL engineers have completed a special 9-station drum-type high production machine for drilling, tapping and chamfering a complete range of pump bodies for a large manufacturer of fuel pumps.

Different pump models are interchanged on the machine by substituting the proper auxiliary head for different bolt circles. Heads are cluster style which facilitate change-over.

In addition to its flexibility, this new machine is unusual because it has the first cluster style heads designed to operate high speed cutting tools at maximum speeds. The machine is capable of drilling at the rate of 12" per minute.

## Modern Tools Cont'd.



Composed of right and left stations, the machine cycles completely in 21 seconds, drilling tapping and chamfering 57 different holes in 14 different sizes, ranging from .062" to 1 1/2" in diameter, 20 to 32 threads per inch.

Of basic Barnesdril Unit-Type construction, the machine consists of one 30 H.P. Unit with 38-spindle head, two 1 1/2 H.P. Units with one single spindle and one 2-spindle heads, two drilling Units, one single spindle Lead Screw Tapping Unit, and one 15-spindle Lead Screw Tapping Unit.

### Seymour installs Sendzimir reversing cold strip mill

New equipment valued at approximately \$2 million is being installed at The Seymour Manufacturing Company's plant in Seymour, Conn., to speed production and to further improve the firm's non-ferrous strip and sheet output.

Most important of the new units is a Sendzimir Reversing Cold Strip Mill, which provides maximum rolling without annealing, high luster on the finished strip, improved surface quality and closer control on gauge tolerances and edge-to-edge variation.

This mill will be augmented by a large fast slitter for extremely rapid production. Also, a Rockwell Continuous Strip and Sheet Pickling Line, permitting almost uninterrupted pickling at high speeds of a wide range of widths and gauges, will make possible



nearly unbroken operation on long runs of metal.

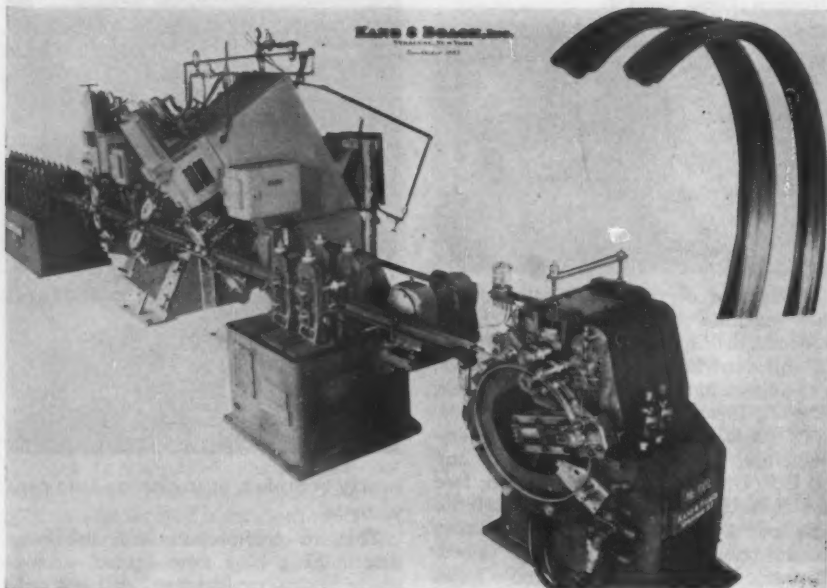
This, in conjunction with the Sendzimir Mill, plus new control atmosphere annealing furnaces, will not only improve the time cycle of manufacturing, but will make possible finished metal with a cleaner, brighter and more perfect surface.

### Bicycle rim mill

In operating the bicycle rim mill of Kane & Roach, Inc., Dept. BB, Syracuse, N.Y., strip is taken from a coil box to the slitting unit where the stock is edge trimmed to size, then coldroll formed into the bicycle rim contour. The formed rim then passes through the welding unit, comprised of three heavy duty seam welders, where it is welded at the joint and at each side of the joint. The two outside welds form a seal which prevents plating acid from entering the open chambers on each side of the rim when the spoke holes have been punched, prior to plating.

From the welders the section goes through a sizing unit and into an automatic bending and cutoff machine

**Modern Tools Cont'd.**



which circles and cuts off the formed sections into individual rims which are then delivered onto a receiving arm.

Tooling for this mill is for two types of rims—the modified Westwood and

the modified Raleigh.

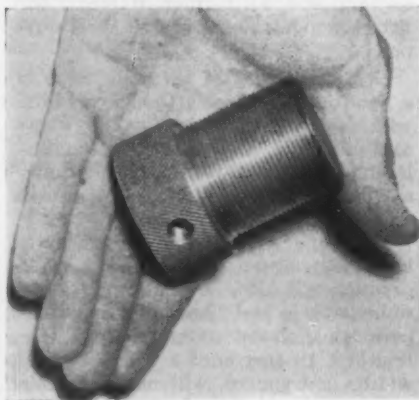
Material is S.A.E. 1010 strip and production is 35 feet per minute. Diameters of rims range from 18" to 26".

**105" long cast bronze tubes cut machining time, scrap**

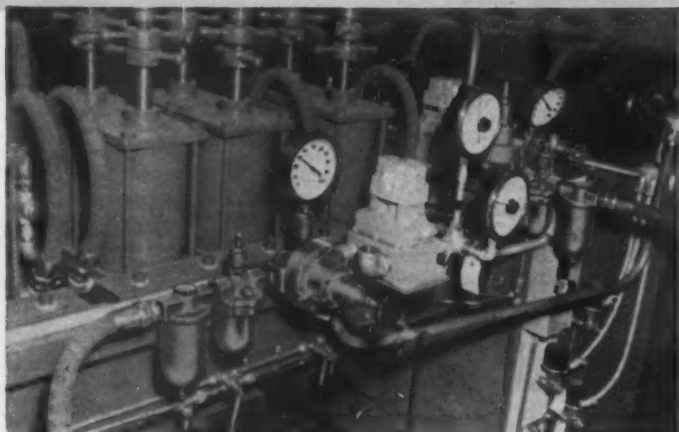
The so-called "standard" 13" lengths of semi-machined cast bronze tubing (83% copper, 7% tin, 7% lead, 3% zinc) were not suited for machining on turret lathes at the Acker Drill Company, Inc., Scranton, Pa., manufactureres of core drilling rigs for the mining and construction industry.

A switch to 105" lengths of continuous-cast bronze, made of the same alloy by the American Smelting and Refining Company, enabled Acker to reduce machining costs substantially because the long lengths are ideal for turret lathes. The material is available from stock. There is almost no scrap

View of 2 3/16" long packing nut used in Acker water swivel.



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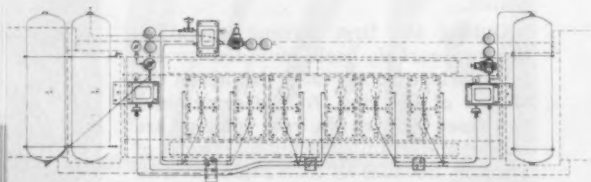
Sciaky Bros., Inc., largest manufacturer of electric resistance welding machines, has used Norgren equipment since it began manufacturing in the U. S. in 1907. Every welder they produce includes some Norgren components... regulators, lubricators or hose. Sciaky selected Norgren Pilot-Controlled Regulators because they provide dependable, accurate air regulation necessary to produce uniform welds of high quality, and provide the volume of air flow necessary to operate the many cylinders incorporated in their equipment.

The Series 20AC and 20AA Regulators were originally developed by Norgren for the welder industry. These pilot-controlled units provide extremely accurate pressure regulation, with high air flow capacities.

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used on boring mills, air-powered pumps, pressure generators, presses, clamping cylinders, air chucks and many air tools. They pay for themselves in savings in air costs alone... and, provide accurate air regulation essential to high operating efficiency and long equipment life, with minimum maintenance costs.



Air Circuit drawing for Sciaky Welder shown above. Norgren Lubro-Control Units filter the air, regulate the air pressure to 12 cylinders and provide oil-fog lubrication for cylinder walls and piston packing.



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### **Modern Tools Cont'd.**

loss with the continuous-cast material because with the longer lengths short-ends are negligible. For example, Acker cuts a 2 3/16" long packing nut from 2 1/2 O.D. x 1 1/2 I.D. Asarcon stock. Allowing 3/8" per sawcut, a 105" length will yield 35 packing nuts. The short-end remnant is 2 3/16". Nine pieces of ordinary 13" hollow bar stock would be needed to produce the same number of nuts. There would be eight 1 1/4" remnant pieces and one 4 3/16" piece. Total scrap would be 14 3/16", as compared to 2 3/16" with the 105" continuous-cast length.

### **Hydra-Feed lathes Produce Tank Components**

Production turning of heavy duty tank transmission parts at a plant of one of the major automotive companies puts a premium on the ruggedness and versatility of the lathes needed to do the job. To achieve maximum production efficiency, five Model HD-24 automatic lathes built by Hydra-Feed Machine Tool Corporation, Ferndale, Michigan, were tooled up to perform the series of turning operations.

The tank transmission parts are turned from rolled and welded SAE 8740 rings. All cuts are at approximately 360-420 surface feet per minute. For the first three roughing operations, the Model HD-24 lathes are equipped with 50 hp motors and 30 hp motors are used for finish turning. The final lathe in the production line mounts a tool on a platen.

During the first turning operation, the two carbide tools mounted on the top carriage rough bore the inside diameter of the ring. At the same time, two more tools on the rear carriage are facing and counterboring one side of the ring. Because all tools rapid advance on the Hydra-Feeds, cycle time in this operation, as in all others, is held to a minimum.

At lathe No. 2, the ring is turned over and clamped internally to turn the O.D. and to face and counterbore the second side. A single tool is used in the top carriage, while two are mounted in the rear carriage.

Roughing a 1-inch wide groove is the third operation. The ring is again turned over and the 2 1/4-inch deep groove is cut at 0.015 feed using a 5/8-inch tool on the rear carriage and a 1/2-inch tool on the top carriage. Cycle time for this rugged operation is approximately 3 minutes as compared with about 20 minutes formerly.

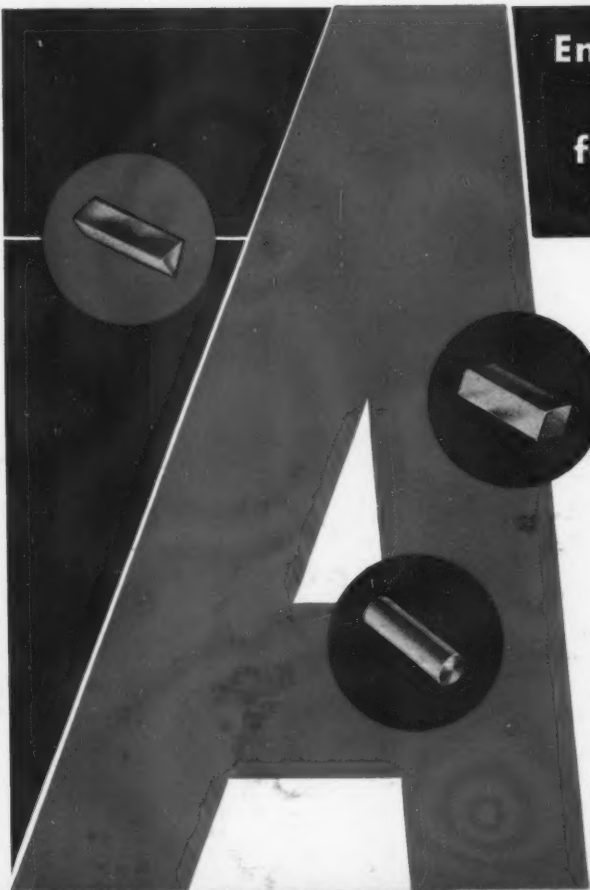
Finish turning begins on the fourth machine where the top carriage finish bores the inside diameter and finish turns a step in the outside of the groove. The rear carriage uses two tools to finish face two surfaces on one side of the ring.

In the final operation a platen is used in addition to the top and rear carriages. The platen tool is used to counterbore on the inside diameter of the groove while the top carriage tools finish turn the O.D. and the tool on the rear carriage finish turns the groove.

The reason for selecting this particular size of lathes was the large swing requirement of the parts that have a finished diameter of 21.500 inches.

Close-up of tank transmission ring at completion of cutting 1-inch wide, 2 1/4-inch deep groove on Hydra-Feed Model HD-24 lathe. Tool on top carriage is 1/2-inch and rear carriage tool is 5/8-inch. Cycle time is approximately 3 minutes.





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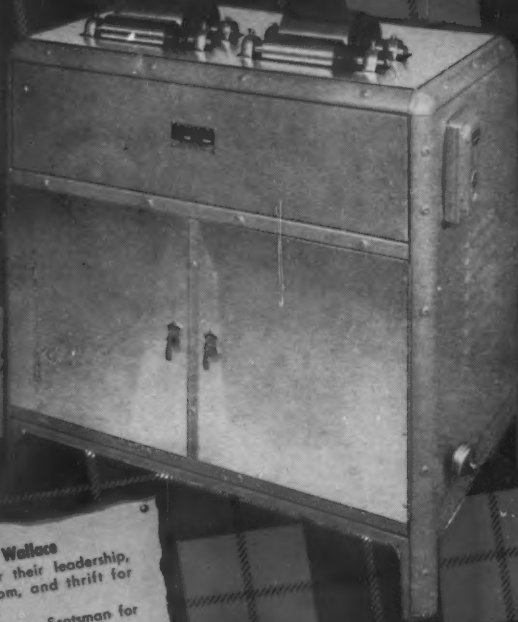
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## First Powdered Alloy Steel Gears Result of Joint Two-Year Project

THE FIRST successful application of the techniques of powder metallurgy to the production of high strength machine parts requiring the properties of solid alloy steel has been jointly announced by three companies. The trio co-operated in a two-year project to develop high strength alloy steel gears fabricated by the powdered metal process.

Vanadium-Alloys Steel Company, a producer of pre-alloyed steel powders since 1949, developed the 4650 steel powder, a pre-alloyed type made by water disintegration of molten metal. Fabrication of the steel powder into gears with tensile strength exceeding 100,000 psi, C-30 particle hardness, and greater resistance to wear than previously used (solid) gears was the job of Keystone Carbon Company.

Hydrex Division of New York Air Brake Company, carried out extensive tests of performance and durability, made the final application of the gear to

- 4650 is a pre-alloyed type powder made by water disintegration of molten metal
- tensile strength of gears exceeds 100,000 psi
- particle hardness is C-30
- made in 1½-inch pitch dia.; lengths from ¼ to 1½-inches
- powdered steel gears equal to cut gears

its line of hydraulic pump equipment, and reports considerable savings in cost as well as superior characteristics for the powdered steel gears.

Keystone Carbon is presently producing the powdered alloy steel gears in 1½-inch pitch diameter with lengths ranging from ¼-inch to 1½-inches.

Field tests and accelerated life tests were carried on by Hydrex over a period of two years to determine the performance characteristics of the pow-

dered steel gears relative to the known performance of the cut steel gears formerly used. After thousands of test hours, in the laboratory and in the field, the performance of the new gears was such that in the opinion of the engineers at Hydreco the gears were equal, if not superior, to the cut gears originally used.

The uniformity of one gear to another, the superior surface finish on the teeth, the resistance to wear and the very high strength, not to mention the cost reduction, were all factors which led Hydreco to approve the gears for production.

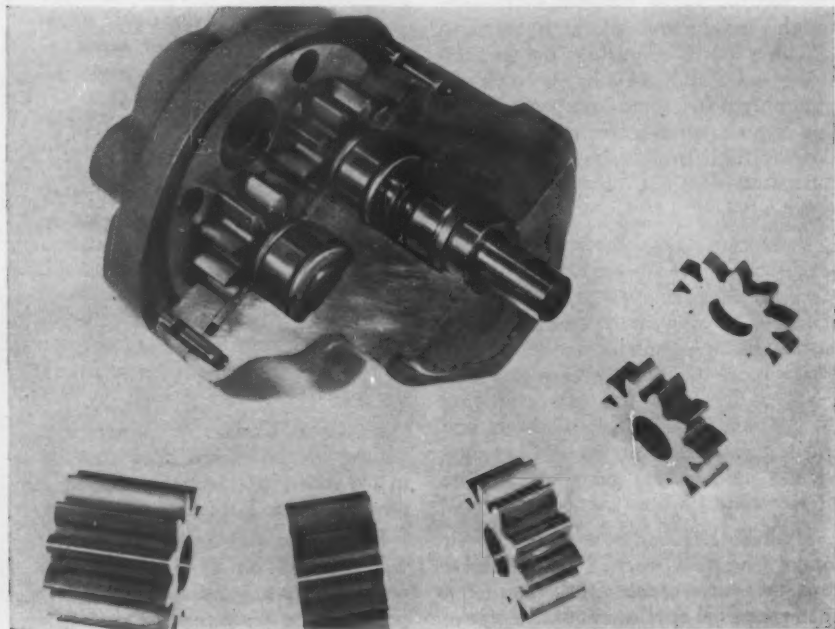
Any wear or scoring of the gear end faces is immediately reflected in loss

of pump efficiency. Tests made under varying conditions of temperature, pressure, speed, pump running clearances and oil cleanliness indicated superior resistance to end face wear and scoring.

The surface finish on the faces of the powdered steel gear teeth is important in a hydraulic pump application as the volumetric efficiency is dependent on the seal offered by the mating of the teeth of the two pump gears.

Performance characteristics of the new gears result from the properties of Vanadium's new pre-alloyed steel powder. The alloy content, for example, makes it possible to harden a thick section completely through, to provide

**First Alloy Steel gears from powdered metal, and cutaway of Hydreco pump, first product to use them.**



a strong core as well as a hard surface.

Parts made from the pre-alloyed steel powder respond to heat treating in the same manner as parts made from bar stock having the same chemical analysis. This characteristic makes it possible to produce high tensile strength parts over a range of density. Parts molded

from the new powder have good green strength, permitting automatic handling prior to sintering. The molded parts do not decrease in size beyond controllable limits during the sintering operation.

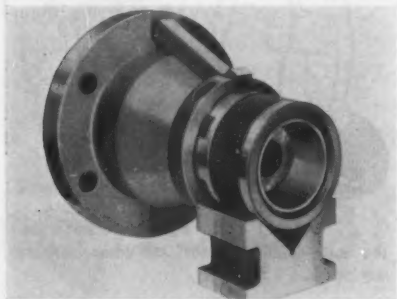
*The End*

## New Chucking Fixture Increases Production

A NEW hobbing fixture, specially designed for Allis-Chalmers Mfg. Co., Springfield, Illinois, by Scully-Jones and Company, Chicago, increases production and accuracy by providing a more powerful, faster method of chucking tractor drive pinions accurately.

The new fixture, similar in design to the manufacturers' standard line of "Roll-Lock" flange-type chucking tools, utilizes the elasticity of metals to compress a solid inner shell evenly and powerfully around the ground hub of the pinion, centering it precisely for hobbing. Because it compresses with equal force all around the chucking surface, the fixture eliminates runout, and pitch-line concentricity of the cut gear is more accurate than can be produced with conventional chucks.

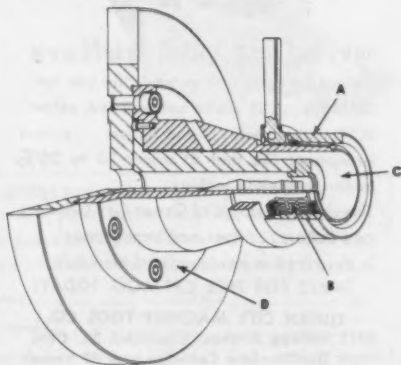
**1. Chucking Fixture is adaptable to all vertical and horizontal hobbing machines to increase accuracy and production.**



Loading and unloading of the pinions is simple and fast because the operator merely twists the actuating ring a few turns (very little turning force required) to create an extremely accurate and powerful fit. A special lever, figure 1, engages notches in the actuating ring and facilitates actuation and release. Results on this job, according to Allis-Chalmers, is an over-all production increase of 10%, plus improved finish and accuracy. Hob life is also improved due to the extremely rigid setup.

Operation of the fixture is as follows:

**2. Cut-away view shows location of precision rollers, mounted at slight spiral angle between two tapers. Twisting outer ring causes powerful wedging action between tapers, and compresses inner chuck body against workpiece.**





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By turning actuating ring A, figure 2, in opposite direction to angle of rollers B retained in cage between chuck body C (having outside taper) and actuating ring A (having inside taper), the outer ring is forced towards the chuck flange D as though it was threaded. This creates a powerful wedging action between the two tapers and compresses the wall of the chuck body evenly and powerfully against the shaft or hub of the workpiece.

The hobbing fixture is adapted to different hub lengths by inserting spacers, figure 1, into the chuck body. Different diameter pinions are chucked in the same fixture by means of split collets. These flange-type chucking tools may be adapted to all vertical and horizontal hobbing machines, as well as to lathes, honing machines, grinders, boring machines, gear shapers, testing machines, cutter sharpeners, and as tool chucks on a variety of machines on which shank-type cutters are used. Runout is often less than .0001", depending on the accuracy with which the chucks are mounted on the machine.

**The End**



" . . . There I was, squatted down at the end of the planer, all absorbed in my work . . . "

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I am interested in more information on \_\_\_\_\_

Name \_\_\_\_\_ Title \_\_\_\_\_

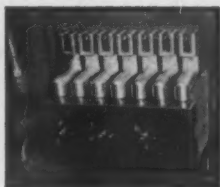
Company \_\_\_\_\_

Address \_\_\_\_\_

# Do your machining up to 10 times faster!



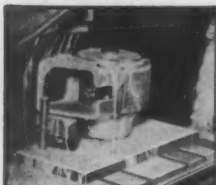
• Originally turned on lathe, now rough and finish-ground at 600 per hour.



• These pieces formerly milled now belt-ground 5 times faster.



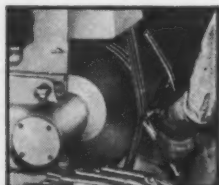
• Grinds broad areas flatter and faster than radial surface grinder.



• This grinding operation 100% faster than former milling time.



• Generates 2 radii at double the output by hand filing and polishing.



• Replaces polishing jack — eliminates costly setting up of glued wheels.

## Porter-Cable ABRASIVE BELT GRINDERS

Abrasive Belt Grinding removes stock rapidly, provides fine finish free of tool marks. Greatly simplifies fixtures — or eliminates them entirely. (Often makes hand presentation possible.) Is up to 10 times faster than milling, shaping, polishing or ordinary grinding — frequently saves 75% to 90% of previous set-up time.

Wet-belt or dry-belt models (determined by material to be worked) available for flat surfacing, contour grinding, centerless grinding, generating radii, beveling, burring and polishing.

Let us prove that an Abrasive Belt Grinder can reduce the cost of many operations. Send us sample pieces for recommendations — or ask to have one of our production engineers discuss your problems at your convenience, at your plant. Free 32-page case history booklet on request.

*Announcing...*

Porter-Cable Abrasive Belt Grinders are now made and sold by Engelberg Huller Co., Inc. — manufacturers of precision machinery since 1888.

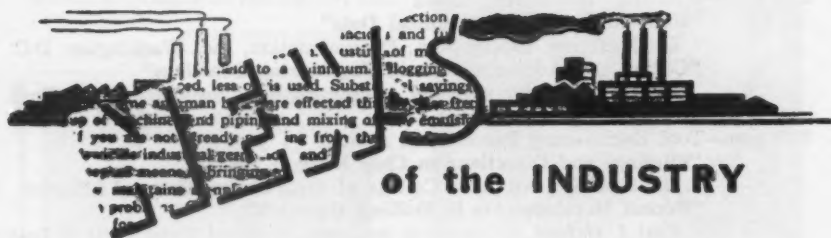
### Grinders for every application



**The ENGELBERG HULLER CO., INC.**

811 West Fayette Street

Syracuse, N. Y.



## of the INDUSTRY

### Program for ASTE Annual Meeting Announced

Over 40 of the nation's leading executives and engineers will speak on current industrial and production problems and technical developments during the five days of the 23rd annual meeting of the American Society of Tool Engineers in Los Angeles, March 14-18.

The meeting will be held in conjunction with the first ASTE Western Industrial Exposition in Los Angeles' Shrine Auditorium and Exposition Hall. Daytime technical sessions will be held at the Shrine Auditorium, evening sessions at the Ambassador Hotel.

**Aerial view of Los Angeles.**



## Program of Technical Sessions

### Monday, March 14—Professional Developments Day

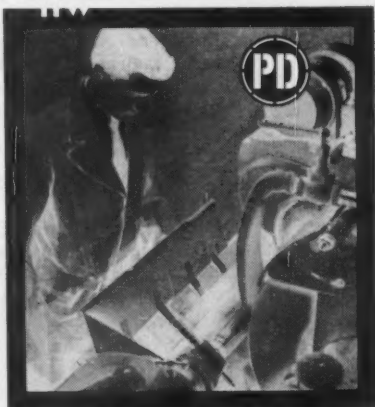
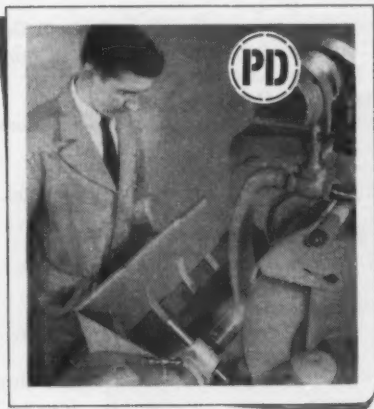
- 2:00 p.m.—“Magnesium Plate for Strong Light-Weight Fixture Construction”  
Raymond L. Nelson, development engineer, Magnesium Technical Service, Dow Chemical Co., Midland, Mich.
- 2:30 p.m.—Industrial Numbering Codes  
“Uniterm Coding of Technical Data”  
Dr. Mortimer Taube, pres., Documentation, Inc., Washington, D.C.  
“Coding and Administration of Engineering Drawings”  
James A. Catto, manager, Administrative Services Dept., Ford Motor Co., Detroit
- 8:00 p.m.—Tool Engineering Research in Action  
“Findings and Directions in Chip Breaker Design”  
Dr. Erik K. Henriksen, College of Engineering, Univ. of Missouri  
“Recent Developments in Drilling Research”  
Carl J. Oxford, Jr., research engineer, National Twist Drill & Tool Co., Rochester, Mich.  
Report on ASTE research into workpiece temperature distribution  
Leslie S. Fletcher, ASTE Research Fund director

### Tuesday, March 15—Pressworking Day

- 9:30 a.m.—(Co-sponsored by the Southern California Section, Society of Plastics Engineers) Plastic Tooling for Production  
General chairman, Walter H. Kadlec, president of the Southern California Section  
Session moderator, G. J. Walkey, manufacturing research engineer, Lockheed Aircraft Corp., Burbank, Calif.  
“Improved Designs for Plastic Tooling”  
John Delmonte, general manager, Furane Plastics, Inc., Los Angeles  
“Cast Plastic Tooling as Used in Aircraft”  
Louis E. Frost, tool engineer, North American Aviation, Inc., Inglewood, Calif.  
“Reinforced Laminates in Aircraft Tooling”  
Richard Morozowicz, plastics engineer, Douglas Aircraft Co., Santa Monica, Calif.  
“Are Plastic Tool Standards Needed?”  
George C. Adams, staff engineer, Rezolin, Inc., Los Angeles
- 2:00 p.m.—Presswork Tools and Methods, panel discussion  
Members of panel:  
Harry Aikens, factory manager, Norris-Thermador Corp., Los Angeles; Max Lauderback, superintendent of metallurgy, Kaiser Steel Corp., Fontana, Calif.; Alfred T. Rando, partner, B & M Engineering Co., Burbank, Calif.; E. C. Rork, plant manager, Arcturus Mfg. Co., Venice, Calif.; L. H. Trautman, Aluminum Co. of America, Pittsburgh
- 8:00 p.m.—“Advantages in Leasing Production Equipment”  
R. A. Perkins, assistant secretary-treasurer, Kearney & Trecker Co., Milwaukee
- 8:00 p.m.—“Setting Goals in Automation”  
W. Fay Aller, director of research, Sheffield Corp., Dayton, Ohio

## A manufacturing achievement that can save you money

Just as a **NEGATIVE** guarantees you an exact duplication of a photograph each and every time, you are always assured a . . .



... **POSITIVE DUPLICATION** of an original grinding wheel each and every time through the **CINCINNATI (PD) Manufacturing Process**.

# NOW!

## Cincinnati Grinding Wheels offer



## Positive Duplication

Here is an outstanding development in precision manufacturing and quality control that *can save you money . . . and increase your production!*

Through the **CINCINNATI (PD) Manufacturing Process** you are assured a **Positive Duplication** of the original wheel every time you reorder. "On grade" with a **CINCINNATI (PD) WHEEL** means all future **(PD) WHEELS** will act and grind exactly alike.

*Yet CINCINNATI (PD) WHEELS are priced no higher than ordinary wheels.*

Contact Sales Manager, Cincinnati Milling Products Division, The Cincinnati Milling Machine Co., Cincinnati 9, Ohio.



A PROMINENT-FOOTED PRODUCT OF THE CINCINNATI MILLING MACHINE CO.



**Wednesday, March 16—Management Day**

**9:30 a.m.—Preparing Engineers for Manufacturing Responsibilities**

General chairman, Prof. R. E. McKee, University of Michigan

**Part One—Moderator, R. L. Hand, manager, general dept. 28-01, Lockheed Aircraft Corp., Burbank, Calif.**

**"General Approach to Realistic Manufacturing Engineering Curricula"**  
L. M. K. Boelter, chairman, Dept. of Engineering, University of California, Los Angeles

**"Specialized Approach to Realistic Manufacturing Engineering Curricula"**

Dr. Ralph J. Smith, head, engineering dept., San Jose State College

**Part Two—Moderator, J. L. Crawford, superintendent of tool fabrication, Santa Monica Div., Douglas Aircraft Corp.**

**"In-Plant Engineer Training for Large Organizations"**

G. W. Papen, production engineering department manager, Lockheed Aircraft Corp.

**"In-Plant Engineer Training for Small Organizations"**

D. Palmer, president, Dwight Palmer & Associates, Los Angeles

**2:00 p.m.—Gears and Splines**

**"Planning for Effective Gear Inspection"**

Fred Bohle, manager machine development, Illinois Tool Works, Chicago

**"Roll-Flowed Forming of Splines and Serrations"**

Harry Pelphrey, chief research engineer, Michigan Tool Co., Detroit

**2:30 p.m.—"Selection of General-Purpose vs. Special-Purpose Machines"**

D. E. Hawkinson, vice-president, machine tool sales, Greenlee Bros. & Co., Rockford, Ill.

**8:00 p.m.—Coordination of Manufacturing Management—panel discussion**

Panel moderator, J. R. Weaver, manager of mfg. engineering, Westinghouse Electric Co., Springfield, Mass.

Panel members: E. W. Ernst, manager, machine tool equipment and planning, General Electric Co., Louisville, Ky.; R. J. Gould, superintendent, Motorola, Inc., Chicago; R. J. Mountain, chief industrial engineer, Pacific Div., Bendix Aviation Corp., North Hollywood; A. A. Signorelli, president, Design Service Co., New York.

**Thursday, March 17—Processes Day**

**9:30 a.m.—Tooling for Non-ferrous High Temperature and Precision Products**

**"Mercury-Pattern Precision-Cast Design and Tooling"**

Dr. Irvin R. Cramer, vice-president, Mercast Corp., New York

**"Ceramic Parts and Tooling for High-Temperature Applications"**

Dr. R. F. Rea, manager, Research & Development Branch, Stupakoff Ceramic Mfg. Co., Latrobe, Pa.

**2:00 p.m.—Shells and Extruded Products**

**"20 mm Shell Tooling and Production"**

W. R. Powl, plant engineer, Armstrong Cork Co., Lancaster, Pa.

**"Tooling for Cold Steel Extrusion"**

J. F. Leland, manager, Metal Forming Div., Parker Rust-Proof Co., Detroit

**Evening—Annual banquet and installation of officers at Cocanut Grove**

Speaker, Prentiss M. Brown, immediate past chairman of the board, Detroit Edison Co., and former U. S. Senator

**Friday, March 18—Precision Control Day**

**9:30 p.m.**—(Co-sponsored by Los Angeles chapter, American Society for Quality Control) **Quality Control Through Realistic Tolerances**

Moderator, Wm. M. Ferguson, general manager, Quality Control Co., Los Angeles

**"Opening Tolerances for Closer Fitting Parts"**

E. E. Bates, assistant to director, Quality Control Div., Northrop Aircraft Co., Glendale

**"Size Tolerance vs. Positioning Tolerance"**

C. E. Deardorff, Bendix Aviation Corp.

**"Converting Engineering Specifications into Shop Practice"**

R. F. Hurt, chief project planner, Lockheed Aircraft Corp.



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for the  
right finish  
faster**

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**High Precision  
DIAMOND  
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Fast, free, cutting action  
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**ENGIS EQUIPMENT COMPANY, CHICAGO 5, ILL.**  
431 SOUTH DEARBORN ST.

**"Who Inspects the Inspector?"**

F. H. Squires, quality manager, Lear, Inc., Los Angeles

**"New Slants on Surface Roughness"**

J. A. Broadston, armament engineer, Aerophysics Laboratory, North American Aviation, Inc.

**2:00 p.m.—Ferrous and Nonferrous Heat Treatment**

**"Heat Treatment of Steels"**

A. V. Leubbers, Jr., chief metallurgist; and R. H. Lundquist, California-Doran Heat Treating Co., Los Angeles

**"Aluminum Heat Treatment"**

Dr. George Perkins, general director, products and application dept., Reynolds Metals Co., Louisville, Ky.

# "RFC" ROLL-FEEDS

## FITS ANY PRESS

For side or rear feeding. All attachments for installing furnished, including disc and connecting linkage.

## CAN'T SLIP

Each wedge has four points of contact to safeguard accuracy.

## REVERSES INSTANTLY

Merely shift feed finger spring from one lug to the other.

## FEEDS IN THOUSANDTHS

Amazingly accurate stock movement assured.

## MAINTAINS ORIGINAL SETTING

Regardless of use or wear. No ratchets or pawls to wear down and "Throw off" feed spacing.

**Ready for mounting! Furnished complete.**

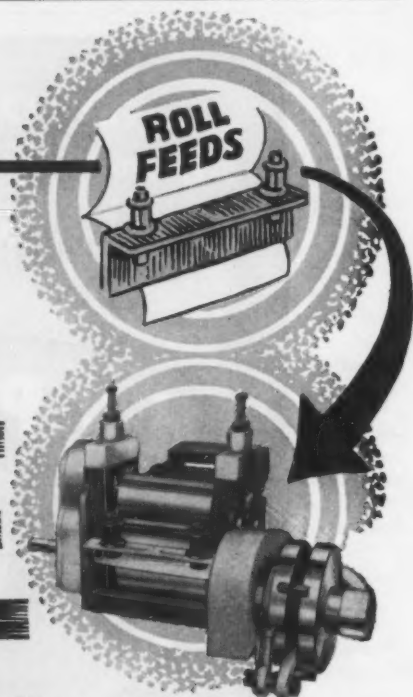
Write today for  
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**EARLY DELIVERY ON STANDARD MODELS**



*Roll-Feeds Corporation*

**ASHTON, R. I.**





## PLAIN PLUG GAGES *class XXX!!*



Chromium Plated Steel Gages,  
Wire Type .010" to 1.010" dia.

Chromium Plated Steel Gages,  
Taper Lock .010" to 1.510" dia.

Tungsten Carbide Gages, Wire  
Type .010" to .365" dia.

Chrome Carbide Gages, Taper  
Lock .365" to 1.510" dia.

*Now available for  
fine inspection requirements*

In response to persistent demand, VK has developed and now announces a new, ultra-fine, plain plug gage tolerance of .00001", designated as Class XXX. This new tolerance, half of that of Class XX, satisfies a need, long evident, for gages to meet part limits finer than .0002", and permitting only ten millionths of an inch total variation on the gage in sizes up to .825" diameter and only fifteen millionths in sizes from .825" to 1.510" diameter. Tolerance may be applied either bilaterally or unilaterally. Inasmuch as Class XXX tolerance must take into account such factors as finer

diameter variation, a high order of roundness control, an exceptional surface finish and an extreme resistance to wear (all of which offset the shallow wear depth inherent in such a gage class), Class XXX is offered in only Chromium Plated and Carbide Gages. VK Class XXX Plain Plug gages are furnished in the materials, styles and ranges shown in boxed panel above. VK also furnishes Class XX, X, Y, and Z standard tolerance plug gages in wire type, taper lock and trilock designs. For complete information address: The Van Keuren Company, 177 Waltham St., Watertown, Mass.

*"Quality in Millionths"*



THE

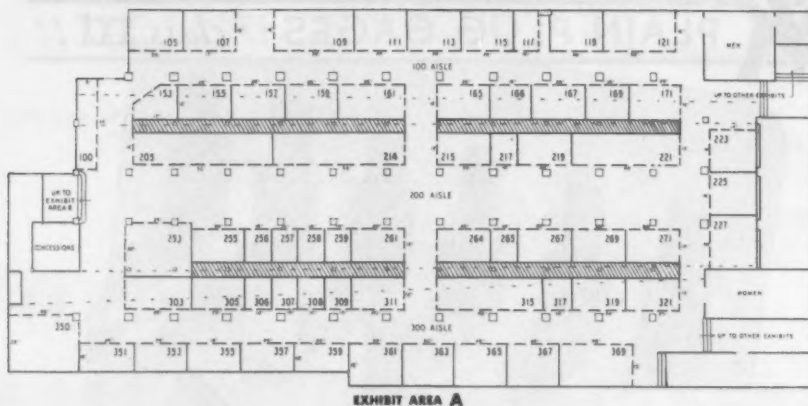
*Van Keuren* co.,

177 WALTHAM ST., WATERTOWN, MASS.

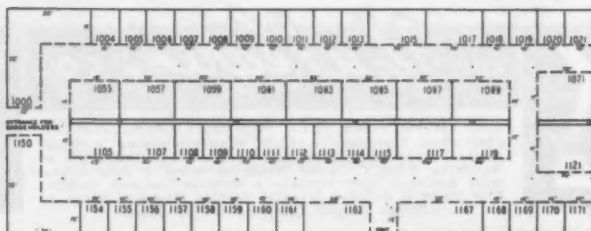
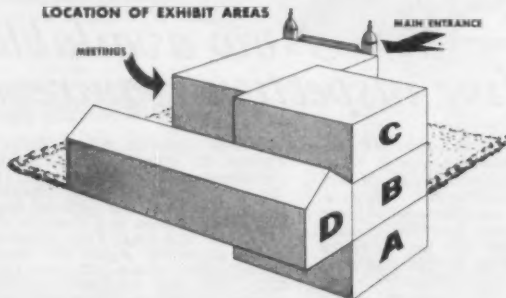
Light Wave Equipment • Light Wave Micrometers • Gage  
Blocks • Taper Insert Plug Gages • Wire Type Plug Gages •  
Measuring Wires • Thread Measuring Wires • Gear Meas-  
uring System • Shop Triangles • Carboloy Cemented Carbide  
Plug Gages • Carboloy Cemented Carbide Measuring Wires •  
Chrome Carbide Taper Insert Plug Gages.



# Floor Plan of Shrine Auditorium, Los Angeles,

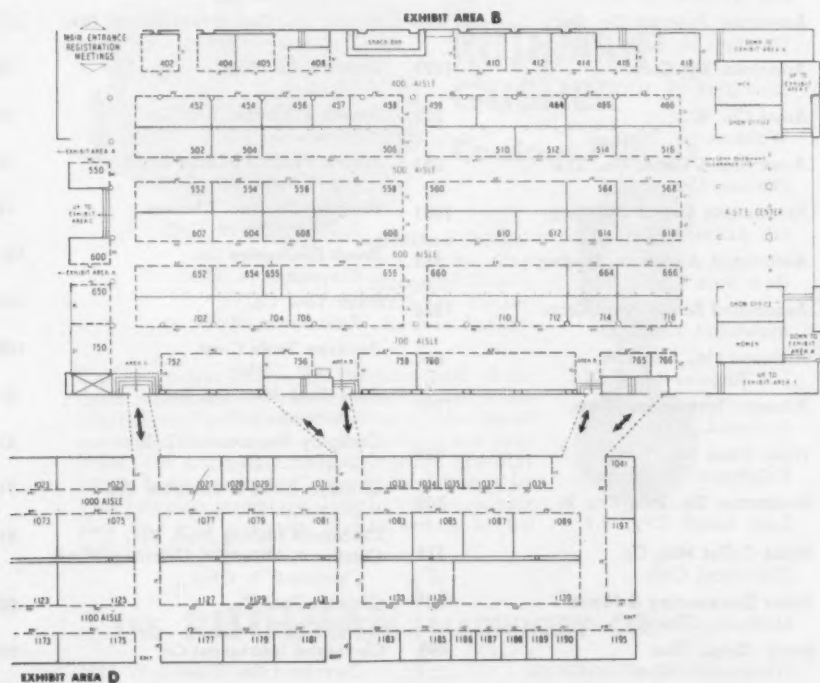
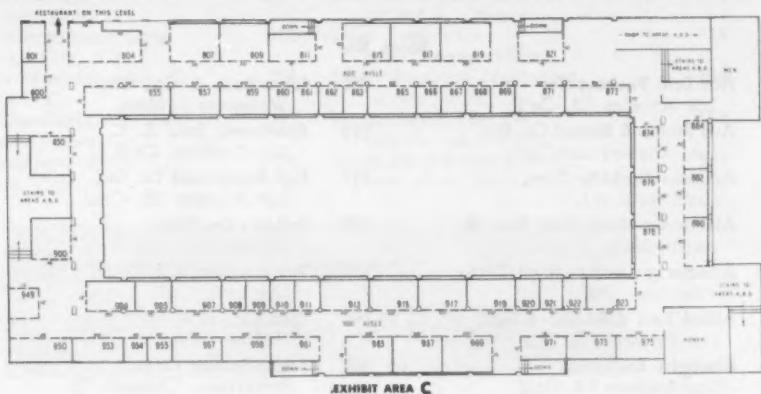


## LOCATION OF EXHIBIT AREAS



es,

# Scene of First ASTE Western Industrial Exposition



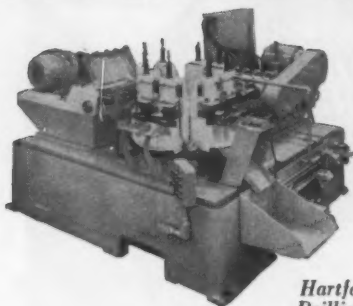


# **List of Exhibitors in 1955** **Western Industrial Exposition**

	Booth No.		
<b>Ace Drill Bushing Co.</b>	<b>800</b>	<b>John Bath &amp; Co., The</b>	<b>161</b>
Los Angeles 29, Calif.		Worcester 8, Mass.	
<b>Ace Stamp &amp; Stencil Co. Inc.</b>	<b>953</b>	<b>Behringer, Inc., A. C.</b>	<b>315</b>
Los Angeles 22, Calif.		Los Angeles, Calif.	
<b>Adamas Carbide Corp.</b>	<b>317</b>	<b>Bell Equipment Co. Inc.</b>	<b>704</b>
Kenilworth, N.J.		Los Angeles 58, Calif.	
<b>Alexander Mach. Ltd., Geo. H.</b>	<b>227</b>	<b>Bellows Co., The</b>	<b>1021</b>
Birmingham, England		Akron, Ohio	
<b>Allegheny Ludlum Steel Corp.</b>	<b>612</b>	<b>Benchmark Mfg. Co.</b>	<b>1071</b>
Pittsburgh, Pa.		Gardena, Calif.	
<b>Allied Tool &amp; Abrasive Sup.</b>	<b>161</b>	<b>Bliss Co., E. W.</b>	<b>913</b>
Los Angeles 58, Calif.		Canton, Ohio	
<b>Almquist Brothers</b>	<b>602</b>	<b>Boyar-Schultz Corp.</b>	<b>452</b>
Los Angeles 54, Calif.		Broadview, Chicago, Ill.	
<b>American Drill Bushing Co.</b>	<b>673</b>	<b>Bradley Machinery Co.</b>	<b>869</b>
Los Angeles 58, Calif.		Detroit, Michigan	
<b>American Pullmax Co. Inc</b>	<b>650</b>	<b>Bristol Co., The Socket Screw Div.</b>	<b>1159</b>
Chicago 18, Ill.		Waterbury, Connecticut	
<b>American Slip Corp.</b>	<b>1077</b>	<b>Brown &amp; Co., Ray</b>	<b>655</b>
New York 17, N.Y.		Rockford, Ill.	
<b>Ames Co., B.C.</b>	<b>602</b>	<b>Brown &amp; Sharpe Mfg. Co.</b>	<b>560</b>
Waltham 54, Mass.		Providence 1, R.I.	
<b>Apex Tool &amp; Cutter Co., The</b>	<b>223</b>	<b>Brown Vertical Milling Head</b>	<b>957</b>
Shelton, Connecticut		Los Angeles 27, Calif.	
<b>Arrowsmith Tool &amp; Die Corp.</b>	<b>1061</b>	<b>Bruning Co., Inc. Charles</b>	<b>702</b>
Los Angeles 45, Calif.		Los Angeles 38, Calif.	
<b>Associated American Trading</b>	<b>967</b>	<b>Brush Electronics Co.</b>	<b>1015</b>
New York 1, N.Y.		Cleveland 14, Ohio	
<b>Associated Screw Prod. Corp.</b>	<b>1028</b>	<b>Buck Tool Co.</b>	<b>1033</b>
Inglewood, Calif.		Kalamazoo, Michigan	
<b>Atkinson Co., Ralph W.</b>	<b>660</b>	<b>Buckeye Tools Corp.</b>	<b>1000</b>
Los Angeles 58, Calif.		Dayton, Ohio	
<b>Atlantic Instrument Corp.</b>	<b>1017</b>	<b>Burg Tool Mfg. Co. Inc.</b>	<b>516</b>
Norwood, Mass.		Gardena, Calif.	
<b>Atlas Press Co.</b>	<b>568</b>	<b>Carboloy Department-G. E.</b>	<b>456</b>
Kalamazoo, Michigan		Detroit 32, Mich.	
<b>Bachmann Co. Inc., Eric R.</b>	<b>402</b>	<b>Chicago Rivet &amp; Machine Co.</b>	<b>716</b>
Long Island City, N.Y.		Bellwood, Ill.	
<b>Balas Collet Mfg. Co.</b>	<b>315</b>	<b>Cincinnati Milling Prod. Div.</b>	<b>412</b>
Cleveland, Ohio		<b>Cincinnati Milling &amp; Grinding Mach.</b>	
<b>Barer Engineering &amp; Mach.</b>	<b>1197</b>	Cincinnati 9, Ohio	
Montreal, Canada		<b>Circular Tool Co.</b>	<b>604</b>
<b>Barry Corp., The</b>	<b>961</b>	Providence 5, R.I.	
Watertown, Mass.		<b>Cleveland Instrument Co.</b>	<b>868</b>
		Cleveland 15, Ohio	

<b>Coast Tool Company</b> Oakland, Calif.	<b>907</b>	<b>Crodian &amp; Co.</b> Indianapolis 20, Ind.	<b>602</b>
<b>Collins Microflat Co.</b> Los Angeles, Calif.	<b>917</b>	<b>Cushman Chuck Co., The</b> Hartford 2, Conn.	<b>1079</b>
<b>Columbia International Corp.</b> Long Island City, N.Y.	<b>100</b>	<b>Dake Engine Co.</b> Grand Haven, Mich.	<b>714</b>
<b>Commander Manufacturing Co.</b> Chicago 24, Ill.	<b>756</b>	<b>Danly Machine Specialties</b> Chicago 30, Ill.	<b>464</b>
<b>Corrosion Chemical Co. of Am.</b> West Los Angeles, Calif.	<b>257</b>	<b>Davis Boring Tool Div.</b> Fond du Lac, Wis.	<b>454</b>
<b>Craley Manufacturing Co., C. C.</b> Shillington, Penn.	<b>1154</b>	<b>Davis Gage &amp; Eng'g, A. C.</b> Hazel Park, Mich.	<b>959</b>

## Precision Pumps for Precision Machinery



*Hartford Special  
Drilling Machine  
Equipped With a  
Ruthman Gusher  
Coolant Pump.*

### RUTHMAN GUSHER Coolant Pumps



Gusher Coolant Pumps are precision built of the finest materials. The rotating shaft is electronically balanced to cut vibration wear to an absolute minimum. The motor is totally inclosed and drip-proof. The heavy-duty ball-bearings are pre-lubricated. You can specify Gusher Coolant Pumps for your precision machinery with the sure knowledge that they will give you efficient service at low maintenance cost.

**THE RUTHMAN MACHINERY CO.**

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<b>Deakin &amp; Son, J. Arthur</b> Jamaica, 32, N.Y.	<b>227</b>	<b>Dietzgen Co., Eugene</b> <b>So. Calif. Div.</b>	<b>564</b>
<b>De Castro &amp; Asso., O. F.</b> Los Angeles 21, Calif.	<b>804</b>	Los Angeles 15, Calif.	
<b>Delta Power Tool Div.</b> Pittsburgh 8, Pa.	<b>113</b>	<b>DoAll Co., The</b> DesPlaines, Ill.	<b>760</b>
<b>Detroit Reamer &amp; Tool Co.</b> Detroit 34, Mich.	<b>874</b>	<b>Dow Chemical Co., The</b> Midland, Mich.	<b>809</b>
<b>Detroit Stamping Co.</b> Detroit, Mich.	<b>404</b>	<b>Drillmation Co.</b> Hazel Park, Mich.	<b>165</b>
<b>Dickerman Mfg. Co., H. E.</b> Springfield, Mass.	<b>558</b>	<b>Drillunit, Inc.</b> Detroit 7, Mich.	<b>1115</b>
		<b>Dumore Co., The</b> Racine, Wis.	<b>758</b>

**NEW SWIVEL-ACTION**

**BURRQWIK**

**HAND DEBURRING TOOL**

*pays for itself  
in one day!*

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the  
UNIVERSAL  
ANSWER

Deburs 4 jobs for every 3 deburred with old-style tools. Patented swivel-action leads blade along edges...no more nicks, scallops, or wrist and arm fatigue.

Hardened high speed tool steel **inter-changeable blades**—small blade for tubing and small holes—a larger blade for straights, radii and large tubing.

Use BurrQwik for all metals and plastics—  
for cut, punched, molded  
and processed edges.



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Without obligation...test—try BurrQwik on your own production jobs—prove its value!

Rated companies may request on letterhead a complete BurrQwik set 500. Act today! Include name and address of your regular industrial supply house.

Anodized aluminum handle and 2 blades. In tough vinylite Pocket Pak—ready for instant use!

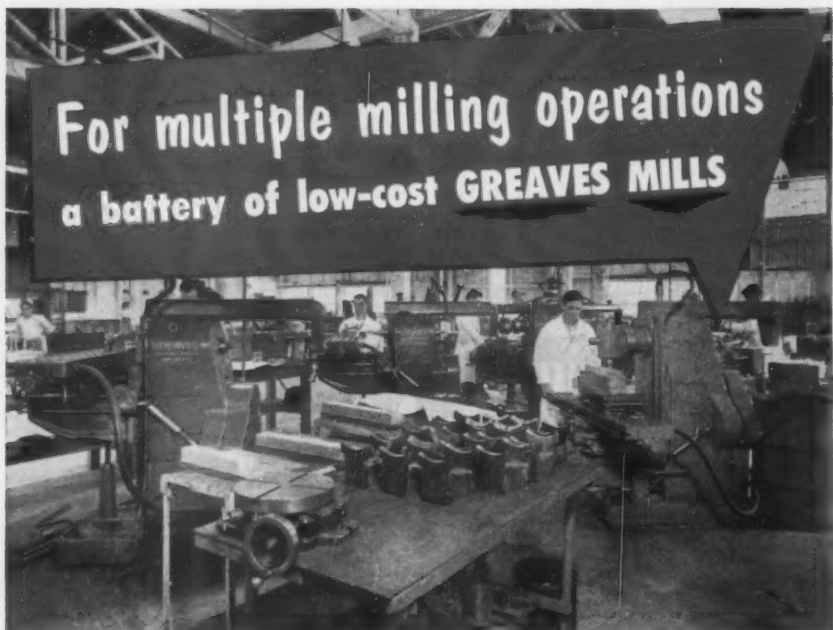
A WORLD OF KNOW-HOW  
ENGINEERING, MACHINING, WELDING,  
METAL STAMPING, AIRCRAFT PARTS



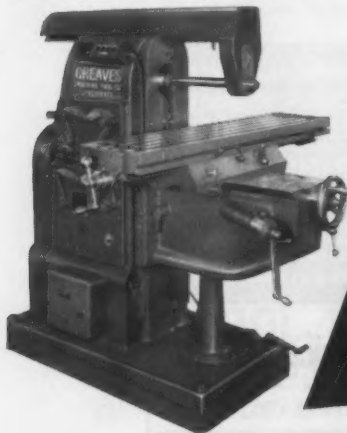
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METAL PRODUCTS, INC.

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## For multiple milling operations a battery of low-cost GREAVES MILLS



**multiple mills  
speed production,  
save set-up time!**



When you get 5 milling machines for the usual price of 2 or 3 . . . set up "production line milling" that's easily adapted to an extremely wide range of parts . . . you also get important savings! So reports an aircraft parts plant that installed 5 GREAVES MILLS, saved capital investment, production and set-up time!

With extra-size tables, 60" x 12" having 34" travel, GREAVES MILLS can be set up for fast, precise machining of larger parts requiring longer travel. Attachments include: dividing heads, vertical and universal milling, rack cutting, slotting, rotary table and others.

Write for Price and Performance Comparison Chart

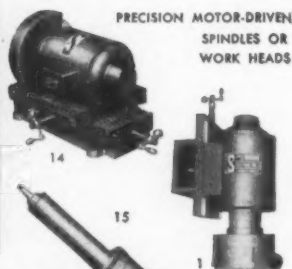
**GREAVES MACHINE TOOL CO.**

**2600 EASTERN AVE., CINCINNATI 2, OHIO**

**Eastern Machine Screw Corp.**, The  
New Haven, Conn.  
**Elastic Stop Nut Corp.-Amer.**  
Union, N.J.  
**Elox Corp. of Mich.**  
Clawson, Mich.  
**Encyclopedia Britannica**  
Los Angeles 57, Calif.  
**Engelberg-Huller Co., Inc.**  
Syracuse 4, N.Y.  
**Engle Equipment Co.**  
Chicago 5, Ill.

315	<b>Equipment &amp; Materials Reporter</b>	955
	Glendale, Calif.	
969	<b>Falcon Tool Co.</b>	315
	Detroit 34, Mich.	
819	<b>Farrand Optical Co. Inc.</b>	1189
	New York 70, N.Y.	
1160	<b>Federal Products Corp.</b>	950
	Providence, R.I.	
1085	<b>Ferguson Machine &amp; Tool Co.</b>	973
	St. Louis 21, Mo.	
466	<b>Flynn Manufacturing Co.</b>	766
	Ferndale 20, Mich.	

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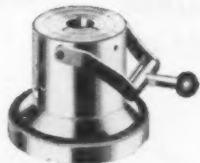
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# Zagar Tools

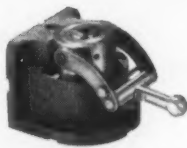
## HOLD YOUR WORK—AND YOUR BUSINESS!



Collet indexing fixture



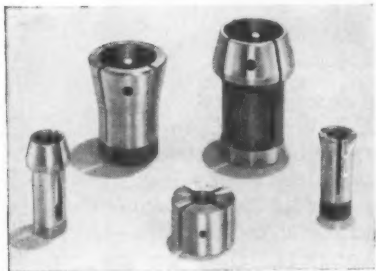
Collet holding fixture



Vertical-horizontal  
collet fixture

### ZAGAR HOLDING and INDEXING FIXTURES

Zagar fixtures offer you a most inexpensive way to machine small parts. Set-up is speeded and much special tooling eliminated. Slot milling, straddle milling, drilling, tapping and grinding of small pieces can be done most profitably with Zagar fixtures, *readily available from stock.*



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<b>Gairing Tool Co., The</b> Detroit 32, Mich.	<b>161</b>	<b>Germain Machinery Co.</b> Los Angeles, Calif.	<b>556</b>
<b>Galland-Henning Mfg. Co.</b> Milwaukee 46, Wis.	<b>750</b>	<b>Giddings &amp; Lewis Machine Tool Co.</b> Fond du Lac, Wis.	<b>454</b>
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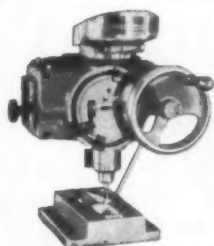


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*Original Designers and Builders of Magnetic Chucks*

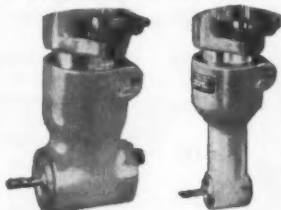


#### Cherring Attachment

Makes possible production of convex and concave shapes. Ideal for producing drop forge dies, molds, cavities, metal core boxes, etc.

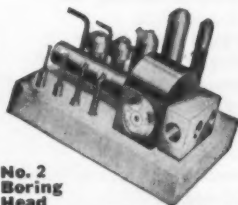
A few of the attachments available

#### Right Angle Attachments



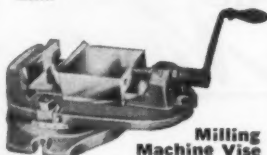
(Left) Heavy Duty . . . for milling and drilling at right angles; fits both Master and 1 HP Bridgeport Heads. (Right) Light Duty . . . for right angle milling and drilling narrow, deep molds and cavities.

Improved and providing great gripping power, with large diameter screw for rigid holding. Streamlined for appearance and equipped with coolant trough. Two sizes: 5" x 3 1/2" and 6" x 5" jaw openings.



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Boring Tools and Holder provide means for boring holes up to 6" diameter; available for use on Bridgeport 1 HP Milling. Drilling and Boring Attachment.



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offers great versatility  
through its wide range of  
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"Bridgeport Millers" in themselves are universally recognized as machines of outstanding utility. Their exclusive method of being able to drill, bore and shape over a wide area without changing set up, has contributed much to their universal acceptance through the convenience, economy and accuracy offered. But this is not the whole story. . . .

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Bridgeport, Connecticut

Manufacturers of High Speed Milling Attachments and Turret Milling Machines

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*New*

**S-22**

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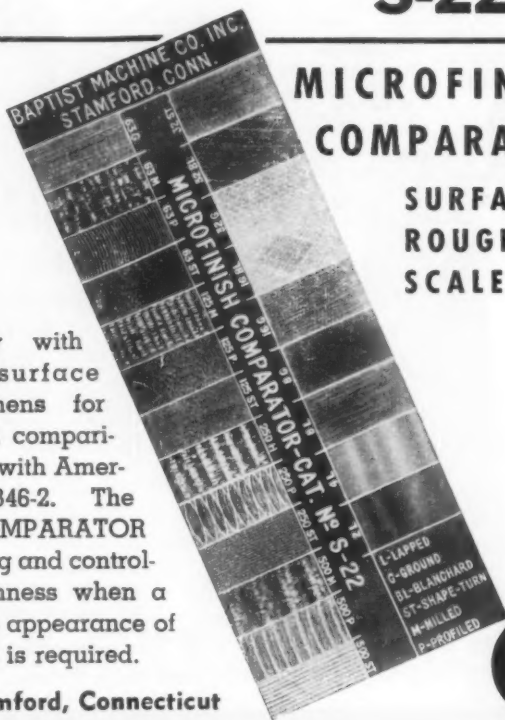
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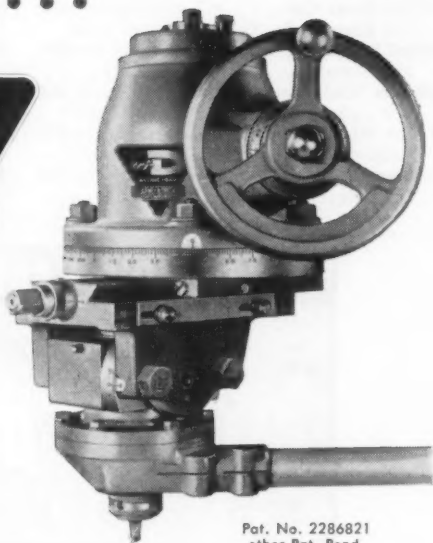
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TRI-D adapted to your milling machine can produce in metal almost any geometric shape employing straight lines, radii or angles... all in a single setup. Power is transmitted to the spindle through a heavy-duty flexible shaft driven by the machine spindle or a variable speed motor unit.

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**1. LATERAL ADJUSTMENT** of the cross-slide permits off-setting the spindle up to  $2\frac{1}{2}$ ". A large dial, graduated in thousandths, is mounted on the cross-slide screw. Precision-ground screw assures the ultimate in accuracy and long life. A friction lock secures cross-slide positions.



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<b>Ideal Industries, Inc.</b> Sycamore, Ill.	<b>264</b>	<b>Jacobs Manufacturing Co., The</b> West Hartford 10, Conn.	<b>552</b>
<b>Illinois Tool Works</b> Chicago 39, Ill.	<b>161</b>	<b>Jamison Steel Corp.</b> Los Angeles 21, Calif.	<b>654</b>
<b>Index Machine Co.</b> Jackson, Mich.	<b>712</b>	<b>Jarvis Corp., The</b> Middletown, Conn.	<b>602</b>
<b>Industrial News</b> Los Angeles, Calif.	<b>355</b>	<b>Johnson Gage Co.</b> Bloomfield, Conn.	<b>866</b>

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Additional refinements and improvements in our process have added still longer life to the wearing edges of Talide tools, dies and wear resistant parts. The result is a carbide having a new, unique grain structure with harder and tougher properties than previous grades. Laboratory tests reveal our improved grades possess 25% greater strength and rigidity. Service life per grind up to 50% longer than previous grades has been proven in grueling field tests.

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HEAVY METAL • CERMETS • HIGH TEMPERATURE ALLOYS  
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<b>Kearney &amp; Trecker Corp.</b> Plainfield, N.J.	614	<b>Latrobe Steel Co.</b> Los Angeles 23, Calif.	502
<b>Kenco Manufacturing Co.</b> Los Angeles, Calif.	1185	<b>Lavalles &amp; Ide Inc.</b> Chicopee, Mass.	359
<b>Kolcast Industries Inc.</b> Cleveland 12, Ohio	1069	<b>Lees-Bradner Co.</b> Cleveland 11, Ohio	253
<b>Lamina Dies &amp; Tools, Inc.</b> Berkeley, Mich.	811	<b>Louis Levin &amp; Son, Inc.</b> Los Angeles 7, Calif.	267



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**Smaller...Yet More Powerful**

**WEIGHT .....5-1/2 POUNDS**

**LENGTH .....16-3/4 INCHES**

**DIAMETER .....2-1/32 INCHES**

**SPEED .....17,000, 14,000,  
12,000, 9,000 RPM (Governed)**

**SPINDLE .....5/8" x 11",  
1/2" x 20", 3/8" x 24"**

**TRY IT! COMPARE IT! BUY IT!**

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AIRCRAFT PRODUCTS...  
GREASE FITTINGS**

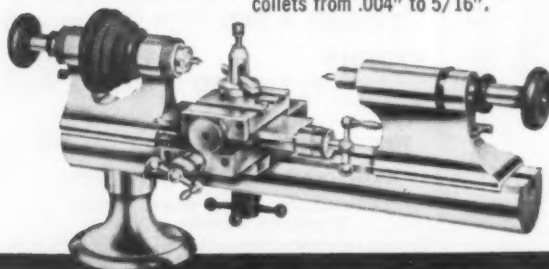


<b>Lewis Production Equipment, Art</b> Glendale, Calif.	215	<b>Loy &amp; Associates, Frank</b> Alhambra, Calif.	878
<b>Liberty Industrial Sales Inc.</b> Los Angeles 21, Calif.	221	<b>Lufkin Rule Co.</b> Saginaw, Mich.	550
<b>Lincoln Industries</b> Minneapolis 5, Minn.	1071	<b>M-B Products Div.</b> Detroit 3, Mich.	909
<b>Lindberg Engineering Co.</b> Chicago, Ill.	666	<b>M. B. I. Export &amp; Import Ltd.</b> Bronx 51, N.Y.	121
<b>Littlejohn Co., Fred G.</b> Los Angeles 29, Calif.	1023	<b>Machine Products Corp.</b> Detroit, Mich.	905
<b>Lovejoy Tool Company, Inc.</b> Springfield, Vt.	861	<b>Machinists' Tool &amp; Supply Co.</b> Los Angeles 58, Calif.	255

SMALL INSTRUMENT PARTS ARE MADE BEST  
ON **LEVIN** LATHES



Twenty-three models for all types of work. 4" swing,  
Bed Length 12" or 18"; over 100 stock sizes of  
collets from .004" to 5/16".



Send for Catalog M describing Lathes for tool work,  
second operations; turrets and full line of accessories.

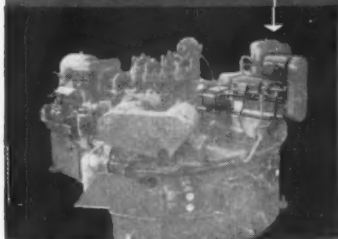
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# New MORRIS AIR·OIL· MATIC DRILL UNITS



air power •  
hydraulic control  
or all-hydraulic  
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Unit type illustrates  
automatic indexing me-  
chanism for drilling, tapping and  
reversing a motor brake cylinder.  
The Air-Oil-Matic unit shown  
drills two .500" diameter holes  
at 10,000 R.P.M. in cast iron.



**perfected to give exceptional versatility  
for higher production at lowest cost**

Here's the automatic drilling unit you've been looking for! The Morris AIR·OIL·MATIC Drill Unit is a powerful package of precise versatility developed and perfected by one of the nation's leading manufacturers of high production drilling machinery. Now, this compact unit (air or oil powered and hydraulically controlled) is available for your use in special purpose machines.

Designed for a wide range of drilling, reaming, chamfering, spot facing, hollow milling, centering and related operations, it can be mounted in vertical, angular or horizontal positions. The Morris AIR·OIL·MATIC Drill Unit has adjustable feed rate, feed stroke, total stroke. Controls and actuating devices can be set to provide almost any desired sequence of operations. (see condensed specifications)

If you have mass production operations involving drilling or related operations . . . you'll want to know all about the Morris AIR·OIL·MATIC Drill Unit. New literature describing the unit, its advantages and applications and complete with specifications, is available on request.

## CONDENSED SPECIFICATIONS

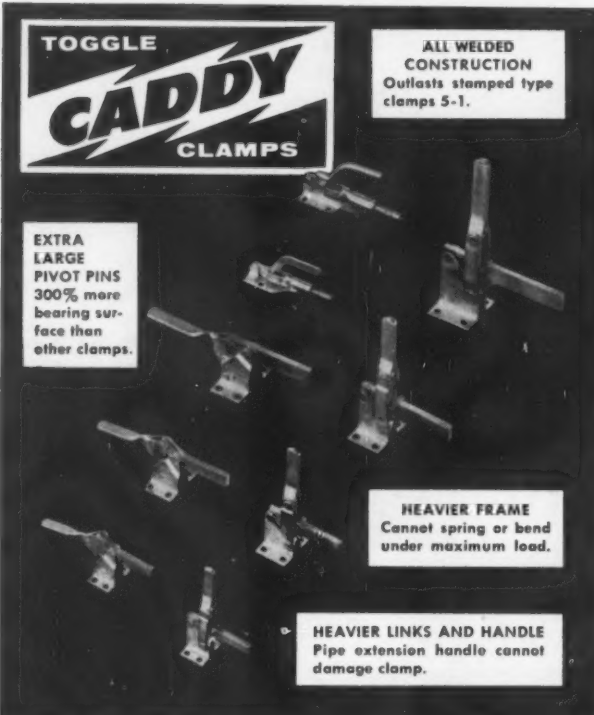
Length, width, height	33 1/4" x 11" x 33"
Maximum HP at 1800 rpm	2 HP
Spindle speeds	132-5900 (Standard) (Special speeds on request)
App. maximum thrust	635 lb.
Maximum drill size	1 1/2"
Maximum stroke	6"
Maximum feed stroke	4 1/2"
Feed rate range	0 to 48"/min.
Quick approach rate	480"/min.
Quick return rate	300"/min.

*Morris* MACHINE TOOL COMPANY

937 HARRIET ST., CINCINNATI 3, OHIO



<b>Magnaflux Corp.</b> Los Angeles 58, Calif.	<b>606</b>	<b>McDonough Manufacturing Co.</b> Eau Claire, Wis.	<b>922</b>
<b>Marshall Steel Co.</b> LaGrange, Ill.	<b>221</b>	<b>Mechanical Engineering Co.</b> Sunland, Calif.	<b>1185</b>
<b>Marshall Tool &amp; Supply Corp.</b> Los Angeles 23, Calif.	<b>1071</b>	<b>Merrill Engineering Labs.</b> Denver, Colo.	<b>1041</b>
<b>Marvel Engineering Co.</b> Chicago, Ill.	<b>807</b>	<b>Merz Engineering, Inc.</b> Indianapolis, Ind.	<b>164</b>
<b>Master Chemical Corp.</b> Toledo 1, Ohio	<b>1004</b>	<b>Metal Removal Co.</b> Chicago 10, Ill.	<b>908</b>
<b>Masters Precision Tool Sales</b> Chicago 9, Ill.	<b>1013</b>	<b>Milford Rivet &amp; Mach. Co., The</b> Milford, Conn.	<b>1131</b>



**TOGGLE  
CADDY  
CLAMPS**

**EXTRA  
LARGE  
PIVOT PINS**  
300% more  
bearing sur-  
face than  
other clamps.

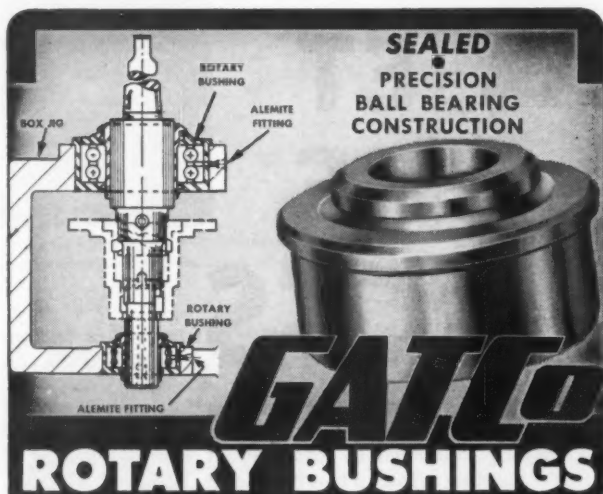
**HEAVIER FRAME**  
Cannot spring or bend  
under maximum load.

**HEAVIER LINKS AND HANDLE**  
Pipe extension handle cannot  
damage clamp.

**ALL WELDED  
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Outlasts stamped type  
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<b>Modernair Corp.</b> San Leandro, Calif.	406	<b>New Standard Division</b> York, Pa.	954
<b>Notch &amp; Merryweather Mach., The</b> Cleveland 13, Ohio	915	<b>Nichols-Morris Corp.</b> White Plains, N.Y.	261
<b>Nelco Tool Co.</b> Manchester, Conn.	1018	<b>Nopak Division</b> Milwaukee 46, Wis.	750
<b>Nelson Stud Welding Div.</b> Lorain, Ohio	159	<b>O. K. Rubber, Inc.</b> Littleton, Colo.	1071
<b>New Hermes Engraving Mach.</b> New York City, N.Y.	457	<b>Oakite Products, Inc.</b> New York 6, N.Y.	880



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ROUGH AND FINISHED BORING**

The inner race of the GATCO bushing rotates with the tool, piloting the tool accurately below or above the work—or both.

Eliminates expensive tool construction—Reduces tool wear—Prevents seizure and pilot breakage—Especially adapted where precision is required.

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<b>Patensbach &amp; Co., C. A.</b> Los Angeles 14, Calif.	<b>359</b>	<b>Portage Double Quick Tool</b> Akron, Ohio	<b>109</b>
<b>Paul-Munroe Co., The</b> Bell, Calif.	<b>971</b>	<b>Precise Products Corp.</b> Racine, Wis.	<b>821</b>
<b>Peck Steel &amp; Die Supply, Inc.</b> Los Angeles 58, Calif.	<b>558</b>	<b>Precision Tool Sales Co.</b> Los Angeles 3, Calif.	<b>610</b>

# GET THE FACTS

## About Hardness Testing

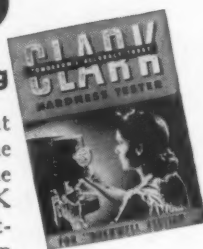
Everything you need to know about hardness testing is told in this handsome book, prepared by the makers of the internationally respected CLARK Hardness Testers for "Rockwell Testing." Simple, easy-to-read text (in English) and numerous illustrations show the equipment and procedure for fast, accurate hardness testing of ferrous and non-ferrous materials. If you would like a copy, *free of charge*, just attach this ad to your letterhead or write "Send book." A copy will be mailed to you promptly.

P.S. If you are interested in descriptions and prices for CLARK Hardness Testers (Standard and Superficial) of *guaranteed accuracy*, say the word and we'll gladly supply them.

**CLARK**  
HARDNESS TESTERS

**CLARK INSTRUMENT INC.**

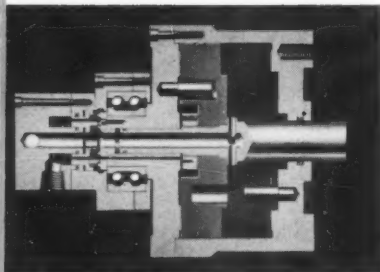
10206 Ford Road • Dearborn, Mich., U.S.A.



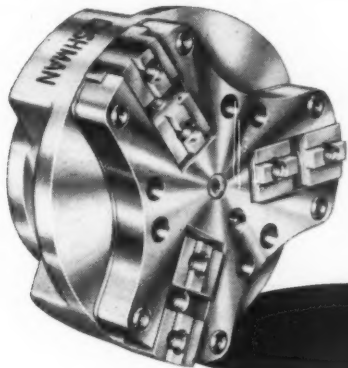
# CUSHMAN chucks

## give Chuck-ability

**CHUCK-ABILITY:** The ability to **SPEED** your work  
... **ELIMINATE** fatigue ... **IMPROVE** your products  
... and **REDUCE** your costs ... through design  
and selection of the right work-holding devices.



Typical Cushman Air Operated Chucks and Cylinders for repetitive machining operations permitting increased production at lower costs.

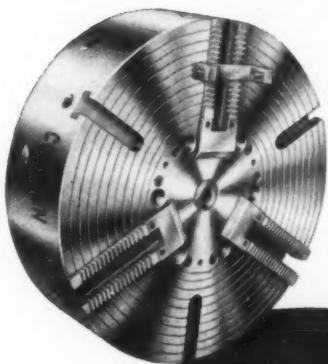


### the key to machining efficiency

Today's repetitive manufacturing demands *efficient* and *economical* operation of high speed machine tools. Cushman Air Operated Chucks and Cylinders give you **Chuck-ability** with satisfactory performance under the punishment of constant day-in and day-out service ... no loss of chuck or cylinder efficiency over a long service life ... no air leakage problems ... and the feature of quick loading and unloading of work-pieces at the touch of foot or hand.

**Chuck-ability** is available to you in Cushman's complete line of manually and air operated precision chucks, designed and manufactured to meet today's high metal working quotas at lower production costs.

Write today for catalogs fully describing Cushman Chucks. Or, should you have a particular work-holding problem, Cushman can give you **Chuck-ability** in a special chuck, designed and engineered to your requirements.



**THE CUSHMAN CHUCK COMPANY • Hartford 2, Connecticut**  
a world standard for precision



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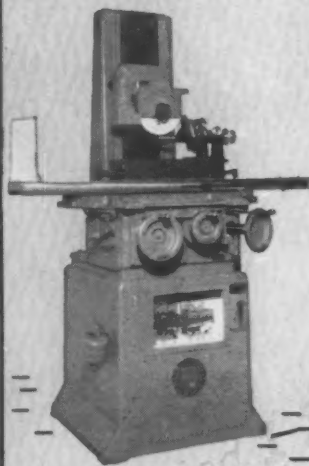
Air Operated Chucks, Cylinders, and Accessory Equipment ... The Cushman Power Wrench ... Cushman Manually Operated Chucks and Face Plate Jaws.

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Modern dividend-paying companies constantly search for better production methods to capture bigger and better markets. The heart of more profitable production lies in modern, efficient toolroom techniques and equipment to provide tools for better and faster production. You can find dividends right in your toolroom when you use Reid precision surface grinders — accuracy, convenience, dependable performance — yes, and many more features that translate into front office dividends. Why not sit down right now and plan your share of these dividends by replacement of *all* your over-age grinders with new Reid Surface Grinders.

#### CONDENSED SPECIFICATIONS — Model 618V

Capacity: 6" x 18" x 17 1/4"

Work table: 51" x 8"

Power Feed: variable, 12 to 35 ft/min

Facts that mean money in your pocket are contained in our latest Bulletin 618-6 . . . write for your copy today.

Reid Brothers



Company, Inc.

BEVERLY, MASSACHUSETTS

# DEPENDABLE



## HARTFORD


## SUPER-SPACERS

*Special*

For the fast and accurate spacing of holes in metal and non-metal materials, the Super-Spacer's dependability is internationally recognized. Mounted vertically, it automatically feeds the Super-Spacer's feed, operates a feeding rate selector, and in stop and start positions automatically retracts the feed. The Super-Spacer's feed is adjustable, and the feed rate is controlled by a hand lever. The Super-Spacer's feed is adjustable, and the feed rate is controlled by a hand lever. The Super-Spacer's feed is adjustable, and the feed rate is controlled by a hand lever.

Write for 5-100 Super-Spacer details.

THE HARTFORD SPECIAL MACHINERY CO., HARTFORD 12, CONN.



**YOU DON'T CUT ANY FASTER . . .**

**you just finish the job  
sooner**

**and at lower cost per piece**

Most *good* modern machines will cut as fast as today's carbide and high-speed tools will take it, so your actual time per cut will be the same, regardless of the machine you use. But when you put jobs like this on an

**JOB FACTS**

**PACKING GLAND NUT** from 4 $\frac{1}{4}$ " round 1112 C.D. Steel.

**12 OPERATIONS** (with 9 tools) including threading and tapping.

**FORMER METHOD** produced 409 pieces in 192 hours on hand operated machine.

**ON MODEL M ACME-GRIDLEY**—325 pieces in 48 hours.

**SAVINGS**—7 to 2 production increase at better than 3 to 1 savings in cost per piece.

*\*Automatically controlled cycle*

**IS STANDARD EQUIPMENT  
ON ALL ACME-GRIDLEYS.**

**Acme-Gridley Fully Automatic Turret Lathe**

you *finish them faster* because non-cutting (idle) time is accelerated and controlled. The complete machining cycle is entirely automatic and pre-determined—to give the minimum time per piece, on *every piece*. Machining is done at the surface speed best suited for required finish and tolerance because each toolslide is independently cammed and selective spindle speeds are automatically controlled.

Ask us to show you how automatically controlled cycle\* can turn non-productive "idle" time into savings like this—on your jobs.

**Send for Catalogs M-50A and MC-53**



**OUR JOB:** to provide the *Right Machine* for **YOUR JOB**



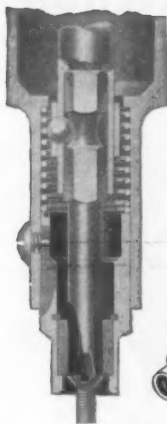
Manufacturers of the world's most complete line of multiple spindle bar and chucking automatics and fully automatic turret lathes.

**THE NATIONAL  
ACME COMPANY**

177 East 131st St., Cleveland 8, Ohio

<b>Procunier Safety Chuck Co.</b> Chicago 6, Ill.	315	<b>Reliant Industries</b> South Gate, Calif.	855
<b>Quality Control Co.</b> Los Angeles, Calif.	882	<b>Rezolin, Inc.</b> Los Angeles, Calif.	923
<b>Racine Hydraulics &amp; Mach.</b> Racine, Wis.	660	<b>Richards Co., I. A.</b> Kalamazoo, Mich.	1019
<b>Rankin Bros. Engineering &amp; Sls.</b> Lynwood, Calif.	1186	<b>Rimat Gage Co.</b> Pasadena, Calif.	860
<b>Ready Tool Co.</b> Bridgeport 5, Conn.	1025	<b>Rockwell Manufacturing Co.</b> Pittsburgh 8, Pa.	113
<b>Red Seal Metals Co.</b> South Gate, Calif.	311	<b>Ross Operating Valve Co.</b> Detroit 3, Mich.	660

## For driving slotted screws **MAGNA FINDER** does it easier, cheaper



The Magna Finder picks up the screw, positions it...so that with one-hand control the bit automatically enters the slot of the screw and drives it home. Alnico Magnet has ten times ordinary "pull" and positively positions screw. Results? Production up, costs down.

Interchangeable with regular power screwdriver finders. Available for *all* makes of power drivers and *all* kinds of screws. Thousands in use. Ask your power screwdriver salesman for a demonstration of the complete Magna Driver line.



NEW manual ready; write Dept. 45F. Complete information on Magna Bit Holders, Finders, Sockets and Hand Screwdrivers. Magna Driver Corporation, 779 Washington Street, Buffalo 3, N. Y.



<b>Rotex Punch Company, Inc.</b> San Leandro, Calif.	157	<b>Sales Service Machine Tool Co.</b> St. Paul 14, Minn.	1031
<b>Royal Oak Tool &amp; Machine Co.</b> Royal Oak, Mich.	107	<b>Sandusky Abrasive Wheel Co.</b> Sycamore, Ill.	264
<b>Rucker Co., The</b> Oakland 8, Calif.	706 & 710	<b>Sargent Engineering Corp.</b> Huntington Park, Calif.	169
<b>Ryerson &amp; Son, Inc., Jos. T.</b> Chicago 80, Ill.	510	<b>Scherr Optical Tools, George</b> New York 12, N.Y.	458
<b>S.P. Manufacturing Co., The</b> Cleveland 6, Ohio	1035	<b>Screw Machine Tool Co.</b> Detroit, Mich.	315
<b>Safety Socket Screw Co.</b> Chicago, Ill.	221	<b>Scully-Jones &amp; Co.</b> Chicago 8, Ill.	554

# CYCLONE SEPARATION

**FOR MORE EFFICIENT  
DUST COLLECTION  
—FILTERS LAST LONGER**



Almost all industrial dusts can be collected more efficiently by Dustkop. Thirty-seven standard models ready to use! Reduce installation costs — save space. Write for descriptive literature.

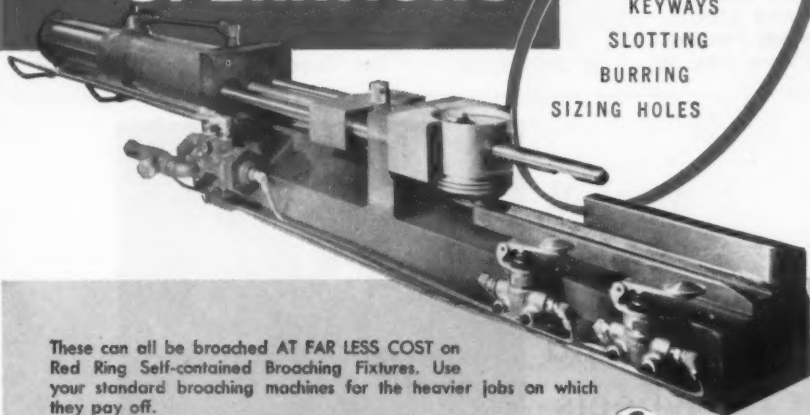
**ALSO A COMPLETE LINE  
OF MIST COLLECTORS**



**AGET MANUFACTURING COMPANY**  
1402 EAST CHURCH ST., ADRIAN, MICH.

# Don't Let Small Parts Clutter Up Your **BROACHING OPERATIONS**

OIL GROOVES  
SMALL SPLINES  
SERRATIONS  
KEYWAYS  
SLOTING  
BURRING  
SIZING HOLES

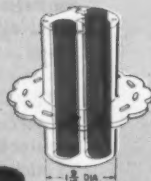
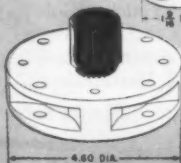
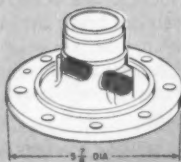
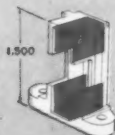


These can all be broached AT FAR LESS COST on Red Ring Self-contained Broaching Fixtures. Use your standard broaching machines for the heavier jobs on which they pay off.

The Self-contained Fixture has its own pneumatic power unit to pull or push the broach. Just set it on a table, connect it to the air line and you are ready to start broaching. Or you may want to mount it vertically to further economize floor space.

Like other fixtures or dies, these units may be stored in the tool room when not in use. They occupy little space and are easily portable. Application is practically unlimited for jobs requiring a "Pull" of 2,000 lbs. or less and a stroke not exceeding 25 inches.

Call a Red Ring Broach Engineer or write for Bulletin B54-9 for more detailed information.



SPUR AND HELICAL  
GEAR SPECIALISTS  
ORIGINATORS OF ROTARY SHAVING  
AND ELLIPTICAL TOOTH FORM

7048

**NATIONAL BROACH & MACHINE CO.**

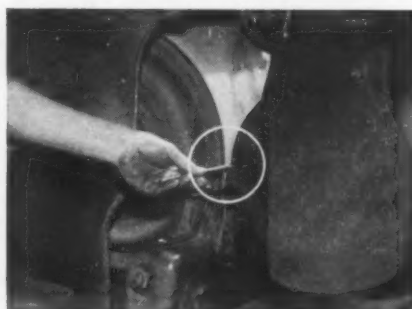
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WORLD'S LARGEST PRODUCER OF GEAR SHAVING EQUIPMENT



<b>Seibert &amp; Sons, Inc.</b> Chenoca, Ill.	<b>920</b>	<b>Simonds Saw and Steel Co.</b> Fitchburg, Mass.	<b>504</b>
<b>Service Machine Co.</b> Chicago, Ill.	<b>1009</b>	<b>Simplex Machine Tool Corp.</b> Milwaukee 46, Wis.	<b>652</b>
<b>Sheffield Corp., The</b> Dayton 1, O.	<b>656</b>	<b>Size Control Co.</b> Chicago 12, Ill.	<b>882</b>
<b>Sheridan Products Inc.</b> Inglewood, Calif.	<b>269</b>	<b>Standard Pressed Steel Co.</b> Los Angeles 28, Calif.	<b>1119</b>
<b>Siewek Tool Co.</b> Detroit 2, Mich.	<b>900</b>	<b>Skinner Chuck Co., The</b> New Britain, Conn.	<b>111</b>
<b>Simonds Abrasive Co.</b> Philadelphia, Pa.	<b>504</b>	<b>Slater Co., Paul B.</b> Los Angeles 23, Calif.	<b>905</b>

## G Bond wheels boost O.D. grinding profits



Users all over the country report Norton G Bond wheels have given them an entirely new slant on the profit-possibilities of their centerless and cylindrical grinding jobs. Among the advantages listed again and again are: *cooler cutting action . . . faster stock removal . . . better finish . . . longer wheel life . . . more pieces per dressing . . . easier dressing, with less wear on diamond or on crushing roll.*

The G Bond is the most efficient vitrified bond ever produced for precision and semi-precision grinding. See your Norton Distributor for facts on how G Bond wheels can bring the value-adding "Touch of Gold" to your O. D. grinding jobs. Or write to NORTON COMPANY, Worcester 6, Mass. Distributors in all principal cities. *Export: Norton Behr-Manning Overseas Incorporated, Worcester 6, Massachusetts.* W-1609

*Making better products . . . to make your products better*

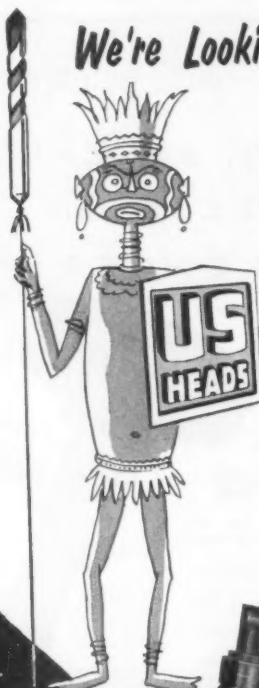


**and its BEHR-MANNING division**

NORTON: Abrasives • Grinding Wheels • Grinding Machines • Refractories  
BEHR-MANNING: Coated Abrasives • Sharpening Stones • Pressure Sensitive Tapes

<b>Southern California Tool &amp; Die Assoc.</b> Los Angeles 1, Calif.	<b>ASTE center</b>	<b>Sunnen Products Co.</b> St. Louis 17, Mo.	<b>752</b>
<b>Standard Gage Co.</b> Poughkeepsie, N.Y.	<b>459</b>	<b>Super Tool Co.</b> Detroit 13, Mich.	<b>416</b>
<b>Standard Parts Co.</b> Bedford, O.	<b>919</b>	<b>Superweld Corp.</b> North Hollywood, Calif.	<b>876</b>
<b>Standard Pressed Steel Co.</b> Jenkintown, Pa.	<b>119</b>	<b>Supreme Products, Inc.</b> Chicago, Ill.	<b>221</b>
<b>Starrett Co., The L. S.</b> Athol, Mass.	<b>765</b>	<b>Sweetland Co., E. D.</b> Pasadena 3, Calif.	<b>921</b>
<b>Steel City Testing Machines</b> Detroit, Mich.	<b>1183</b>	<b>Syntron Co.</b> Homer City, Pa.	<b>884</b>

## We're Looking for Head Hunters!



Most machine tool men have long relied upon the "US" Adjustable Multiple Spindle Drill Heads. But we are looking for those who still haven't tried them . . . and who are looking for the best.

With their quick-change universal joint assemblies, they are built for continuous use, with full anti-friction bearing construction for high capacity thrust loads. The universal joint adjustable multiple spindle type is suitable for any sensitive drilling machine. Joints are self-lubricating. All gears are hardened and shaved with spindles superfinished.

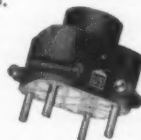
The single eccentric type is used for equally spaced holes on bolt circles.

The new double eccentric AdjUStatix, two to eight spindles, permits spindles to be located in non-symmetrical patterns. It eliminates expensive change in set-up.

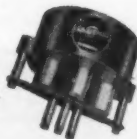
**Write** for details on any type of universal joint adjustable head. Ask also about our totally enclosed gear-driven adjustable, fixed center, or individual lead screw tapping heads.



Universal joint with slip spindle fixed locating plate



Single eccentric type for equally spaced holes on bolt circles



Double eccentric type for irregular spacing

**UNITED STATES DRILL HEAD COMPANY**

616-618 BURNS STREET • CINCINNATI 4, OHIO

<b>Taylor Dynamometer &amp; Mach.</b> Milwaukee, Wis.	862	<b>Tomkins Johnson Co., The</b> Jackson, Mich.	660
<b>Technical Supply Co.</b> Antwerp, Belgium	1170	<b>Tool Sales Co.</b> Detroit 3, Mich.	909
<b>Thalco Glass Fiber Products</b> Los Angeles 5, Calif.	1188	<b>Tool Specialty Co.</b> Los Angeles 11, Calif.	1171
<b>Thor Power Tool Co.</b> Aurora, Ill.	155	<b>Trade Publishers, Inc.</b> Los Angeles, Calif.	355
<b>Thurston Manufacturing Co.</b> Providence, R.I.	359	<b>Transmares Corp.</b> New York, N.Y.	1177
<b>Tocco Division</b> Cleveland 1, O.	414	<b>True-Trace Sales Corp.</b> El Monte, Calif.	167

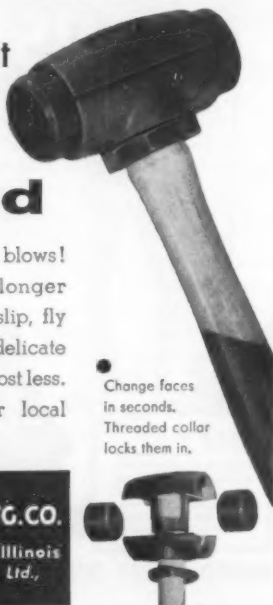
When you want a "soft" hammer  
that's **BETTER, SAFER**  
**COSTS LESS AND**  
**LASTS LONGER**

That's when you want

**C/R**

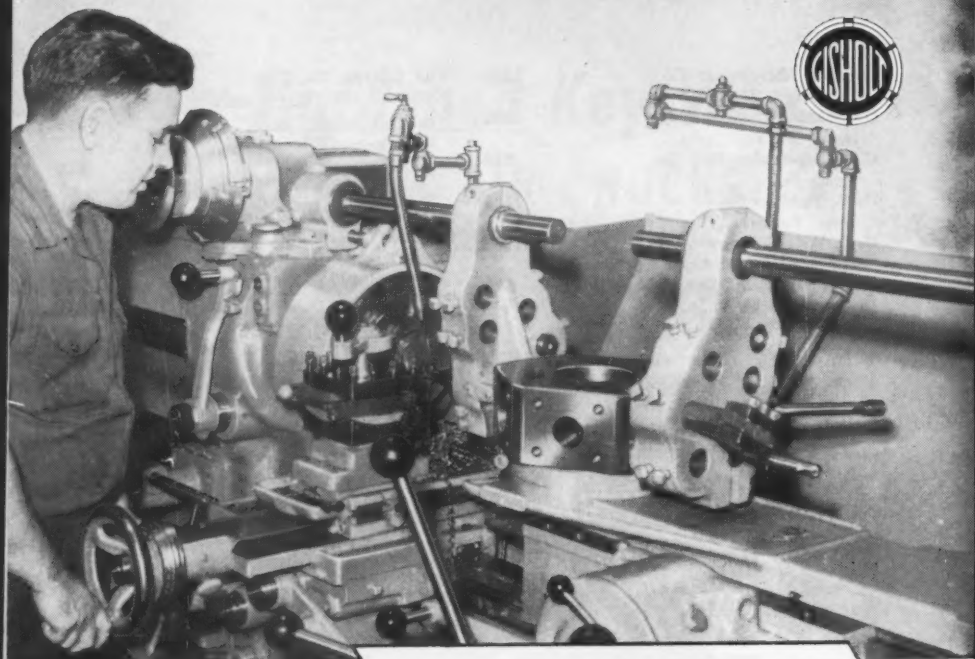
**Jawhead**

They do more work with fewer blows!  
The secret—less rebound, longer  
striking contact. Faces won't slip, fly  
off, crack, or spark. Ideal for delicate  
parts, finishes. C/R Jawheads cost less.  
Buy C/R Jawhead from your local  
industrial supplier.

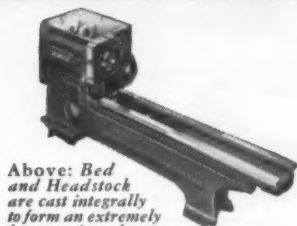


Change faces  
in seconds.  
Threaded collar  
locks them in.

**CHICAGO Rawhide MFG. CO.**  
1301 Elston Ave. Chicago 22, Illinois  
In Canada: Super Oil Seal Mfg. Co., Ltd.,  
Hamilton, Ontario

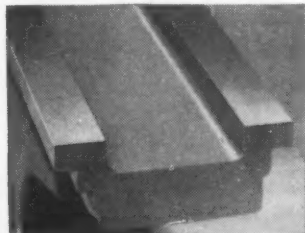


## ACCURACY that doesn't "wear off"



*Above: Bed and Headstock are cast integrally to form an extremely heavy unit and to provide the rigid foundation for all types of work.*

*Below: Block type ways are straddle keyed to the bed and ground in perfect alignment with the spindle. All working surfaces are hardened to 64-66 Rockwell "C".*



Here are two good reasons why you can count on the accuracy of Gisholt Turret Lathes—now and years from now.

One-piece bed and headstock, cast as a heavy, rigid unit, reduce distortion and vibration to a minimum. Headstock is jig-bored to insure—and maintain—perfect alignment of spindle and drive shafts, with ample metal to provide the most solid support possible.

Hardened steel ways are augmented by hardened steel strips secured to the ram saddle, as well as hardened steel gibs and clamps, making an assembly that is virtually wear-proof. Its accuracy is further preserved by force lubrication.

These advantages are yours for the long life of any Gisholt Turret Lathe. Ask for complete details.

THE GISHOLT ROUND TABLE represents the collective experience of specialists in the machining, surface-finishing and balancing of round and partly round parts. Your problems are welcomed here.

# GISHOLT

MACHINE COMPANY

Madison 10, Wisconsin



TURRET LATHES • AUTOMATIC LATHES • SUPERFINISHERS • BALANCERS • SPECIAL MACHINES

**Tubular Micrometer Co.**  
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**Union Manufacturing Co.**  
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**U. S. Expansion Bolt Co.**  
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**U. S. Tool Company, Inc.**  
Ampere, E. Orange, N.J.

**V & O Press Co., The**  
Div. Emhart Mfg. Co.  
Hudson, N.Y.

**512 Van Keuren Co., The**  
Watertown 72, Mass.

**405 Vascoloy-Ramet Corp.**  
Waukegan, Ill.

**954 Vickers Inc.**  
Detroit 32, Mich.

**1169 Viking Tool & Die Shops**  
South Pasadena, Calif.

**1089 Vlier Engineering, Inc.**  
Los Angeles 4, Calif.

**171 Wade Tool Co., The**  
Waltham 54, Mass.

863

618

600

1108

600

321

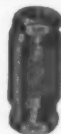
## use **Hanna Valves** for *exacting* **CONTROL**



**HAND  
OPERATED**

**SOLENOID  
FOOT  
OPERATED**

**"FLO-SET"  
PILOT VALVES**



Hydraulic and pneumatic cylinder performance is dependent on the efficiency of the control valves used. That's why it pays to use Valves made by a leader in cylinder manufacture. For more than fifty years, the Hanna name has been synonymous with quality. With Hanna Valves, you have a selection to meet every cylinder operating need, plus the advantages of Hanna engineering services. Get your local Hanna Representative's name from your classified telephone directory or write for complete Valve data.



**Hanna Engineering Works**

HYDRAULIC AND PNEUMATIC EQUIPMENT    CYLINDERS    VALVES    DIVERTERS

**1754 ELSTON AVENUE    •    CHICAGO 22, ILLINOIS**

# Now Hardened Key Ways in *Buck* AIR CHUCKS



## New Standard Feature Added to .001" Precision Adjust-Tru Chucks

Longer wear, longer accuracy — thanks to hardened key ways — is now added to other unique features of Buck Air Chucks. *At no extra cost!*

Now, more than ever, you'll want to consider *all* of the ways the Buck can save you money.

Guaranteed .001" precision.

*Jaws can be machined in the tool room, saving the time-wasting trial and error method and down time of fitting on the chucking machines.*

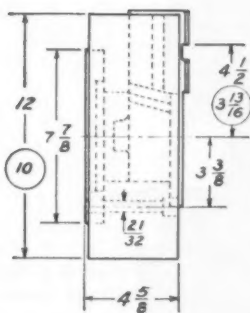
*Hardened jaws can be used for all operations with the Buck, and jobs run intermittently without the need to retrue the jaws for each set up.*

*Final accuracy adjustments can be made under full air pressure. And for safety, the Buck keeps its gripping power should the air line break.*

6", 8", 10" and 12" sizes — 2 or 3 jaws — NO PRICE PREMIUM.

For long accuracy and savings never before possible with an air chuck — get a Buck. Send for complete details today.

***Buck* TOOL CO.**  
312 SCHIPPERS LANE  
KALAMAZOO, MICHIGAN



Principal dimensions on the 10" and 12" chuck mounted to an A1-8" American Standard Spindle Nose.

CIRCLED DIMENSIONS FOR 10" DIAMETER CHUCK.

**CHUCKS**

The Buck Adjust-Tru principle is a unique chuck development.

Jaws grip work like any other scroll or air chuck. After work is gripped opposed screws near the back of the chuck are used to move the chuck on the adapter to bring work to dead true alignment. No further adjustment needed to chuck duplicate parts.

On hand-operated chucks jaws always come back to within .0005" — on air chucks to within .001".



Waldes Kohinoor, Inc. Long Island City 1, N.Y.	664	Western Machinery & Steel World San Francisco 5, Calif.	217
Wales-Strippit Corp. North Tonawanda, N.Y.	1027	Western Metals Magazine Los Angeles, Calif.	1161
Walker-Turner Div. Kearney & Trecker Corp. Plainfield, N.J.	614	Weimore Tool Sales Co. Los Angeles 22, Calif.	857
Warner & Swasey Research Corp. New York 1, N.Y.	911	Wharton & Wilcocks of Amer., Inc. New York 4, N.Y.	308
Webber Gage Co. Cleveland, O.	867	Whistler & Sons, Inc., S. B. Buffalo 23, N.Y.	1067
Weldon Tool Co., The Cleveland, O.	161	Wiley's Carbide Tool Co. Detroit 1, Mich.	303

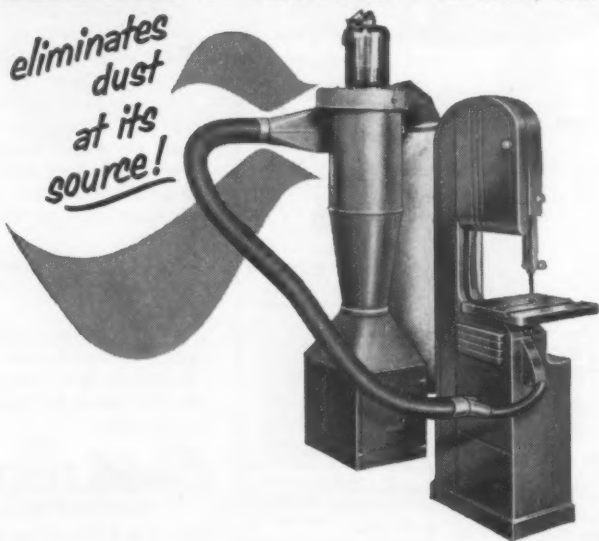
**TORIT**  
**UNITIZED**  
**DUST**  
**CONTROL**

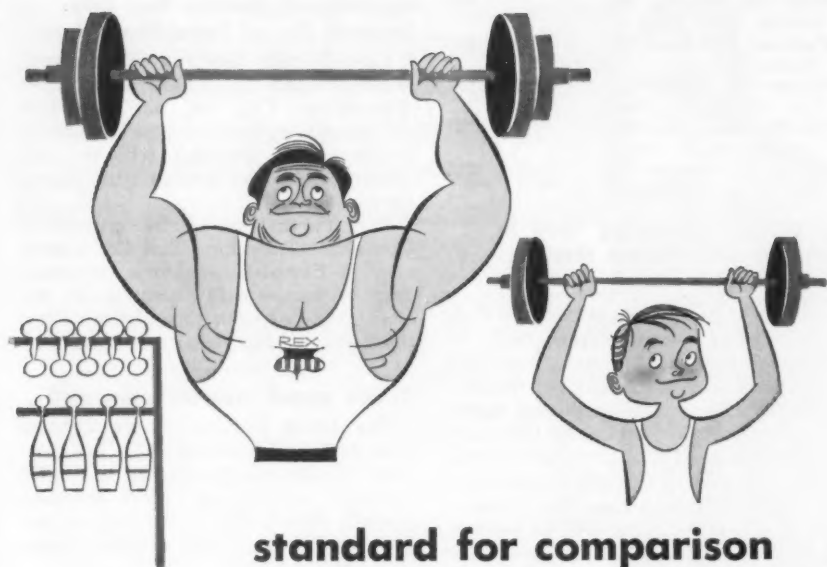
*eliminates  
dust  
at its  
source!*

Torit Unitized Dust Control means each machine has its own custom-tailored dust collector designed to work specifically for that machine. There is no guess work, or average suction. Furthermore, dust control is provided only when that machine is running . . . there is no waste of power such as you have with centralized control when only a few machines are operating. This means better dust control at lesser operating cost and less initial installation cost. Get the facts now on how Torit will work better to . . . "CLEAR THE AIR".

See our catalog in Sweet's Machine Tool File, or write:

**TORIT MANUFACTURING CO.**  
303 WALNUT STREET • ST. PAUL 2, MINN.





**standard for comparison  
...and with high speed steels  
the standard is REX**

Living up to a standard for comparison isn't easy. That's why Crucible lavishes special care on the manufacture of REX® high speed steels . . . to keep REX the *standard* wherever high speed steels are used—as it has been for over half a century.

It's easy to *prove* the superiority of REX. Use it on the job . . . check its size, structure, response to heat treatment, fine tool performance. You'll agree with thousands of other users—you *can't find a high speed steel to outperform REX.*

Remember, REX is made only by Crucible. So call for REX at any Crucible warehouse, or for quick mill delivery. *Crucible Steel Company of America, Henry W. Oliver Building, Pittsburgh 30, Pa.*

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first name in special purpose steels

**Crucible Steel Company of America**

Wilton Tool Mfg. Co. Inc.	801
Schiller Park, Ill.	
Wisconsin Drill Head Co.	857
Butler, Wis.	
Withrow Co., Arthur C.	357
Los Angeles 22, Calif.	
Wolf Machinery Co., W. F.	1083
Los Angeles 58, Calif.	
Zero Index Company, Inc.	225
Los Angeles 24, Calif.	

### **Production Engineering Show to coincide with Chicago Machine Tool Show**

A new industrial exposition, the Production Engineering Show, will be launched in Chicago next September to coincide with the holding of the Machine Tool Show. The combined events are expected to attract 200,000 industrial executives from all over the world.

Both shows will take place from September 6 to 17, inclusive. The Production Engineering Show will be held at Navy Pier and the Machine Tool Show at the International Amphitheatre. A fleet of busses will shuttle visitors between the two halls. The Production Engineering Show will cover the field of automation. 200,000 sq. ft. of display space will be used, and the number of exhibitors is expected to total 225. Automatic mechanisms and techniques for manufacturing and processing industries will be demonstrated. Registration cards may be obtained from Clapp & Poliak, Inc., 341 Madison Ave., New York 17, N.Y.

### **Lodge & Shipley buys Hydraulic Press Co.**

Acquisition of Hydraulic Press Mfg. Co., Mt. Gilead, O., by Lodge & Shipley Co., Cincinnati, through an exchange of stock, has been announced. The merger has been approved by the boards of both companies.

Details of the transaction are being submitted to the directors and stockholders of each.

### **Consolidated Machine Tool Corp. becomes Div. of Farrel-Birmingham**

Consolidated Machine Tool Corp., wholly-owned subsidiary of Farrel-Birmingham Co., Inc., has been dissolved as a separate corporation and its business and activities will be conducted as a division of the parent corporation.

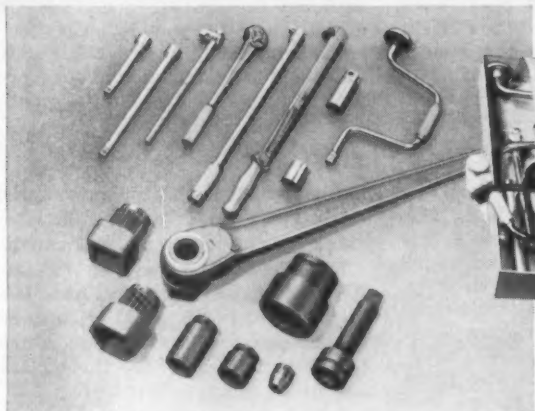
The new division will be operated as Consolidated Machine Tool Co., a division of Farrel-Birmingham Company, Inc. Activities will continue in the Rochester division as before and management will remain the same.

### **Design award program announced**

The James F. Lincoln Arc Welding Foundation, Cleveland, O., has announced the sponsorship of a \$12,000 machine tool design award program. Awards will be made for papers describing the use of arc welding in machine tool design.

The program is open to all persons who are or have been engaged in the design or making of metal cutting or metal forming machine tools. A total of 15 awards will be made: \$3,000, \$2,500, \$2,000, \$1,500, \$1,000 and 10 awards of \$200 each. Papers may describe the design of either a component part or complete machine tool. The tool may be either a metal cutting or metal forming tool as defined by the National Machine Tool Builders' Association. The work or equipment described must have been planned or executed in the period from January 1, 1953 to July 15, 1955. The design may be one that either has been manufactured or one that is planned to be manufactured. It may be either a redesign or a new design. The program closes July 15, 1955. A single author or a group of authors may submit a paper. Booklet describing the program and how to participate is available from the James F. Lincoln Arc Welding Foundation, Cleveland 17, Ohio.

**Your Williams Distributor  
can solve your nut turning  
problem with Williams  
sockets for every production  
or maintenance application**



**"SUPERSOCKETS"**, for Every Nut Turning Problem. 1/4, 3/8, 1/2, 3/4, 1" square drives. Openings from 3/16" to 3-1/8". Engineered flexibility permits hundreds of combinations of sockets, handles and accessories.

**INDUSTRIAL SOCKETS** for all types of power and Impact Wrenches. 1/4, 3/8, 1/2, 5/8, 3/4, 1 and 1-1/2" square drives. Single and double hexagon and square openings from 3/16" to 3-1/2". Over 550 sockets and accessories.

**"SUPERECTOR"** Reversible Ratchet Handles and Sockets. 24, 36 and 48" length handles. Square sockets from 1" to 4-5/8". Hexagon sockets from 1-1/16" to 4-5/8". Sockets with thru-hole turn nuts on bolts of any length.

**J. H. WILLIAMS & CO. • 428 Vulcan Street • Buffalo 7, N. Y.**

**WILLIAMS**  
**INDUSTRIAL TOOLS**  
*"The Broadest Line of Its Kind"*

You'll get  
**SERVICE  
ON  
THE  
DOUBLE**  
from your  
**DISTRIBUTOR'S  
SALESMAN**  
He'll give you quickest  
delivery at lowest cost!



## New Buildings and Expansions

### D. & M. Guard Co. moves

The D. & M. Guard Co., formerly located in North Tonawanda, N. Y., have moved to their new factory located at 889 Military Rd., Kenmore, N. Y.

They have also purchased the FLOHk automatic saw and jointer guard business from the Flohr Mfg. Company of Buffalo, and have moved this business

to their Kenmore site, thereby combining the manufacturing operations of these products.

### New building for Seneca Falls Machine Co

Seneca Falls Machine Co. is constructing a new building adjacent to its main plant in Seneca Falls, N.Y., to house its newly formed electronics division and to provide space for its engineering department. The building, scheduled for completion about April 1, will be air conditioned throughout.

### Roll-Feeds Established in New Plant

Production problems have been alleviated at Rolls-Feeds, Ashton, R.I., since the company's move to its new 30,000 sq. ft. plant at Mendon and Angell Roads. More space and newer, more efficient equipment have stimulate the manufacture of the firm's press feeds, for side or rear feeding.

Feeds are claimed to fit any press. All attachments for installing are furnished, including disc and connecting linkage. Each wedge has four points of contact for accuracy. Reversal is accomplished by merely shifting the feed finger spring from one lug to the other.

The new plant is claimed to be one of the most modern industrial structures in the state of Rhode Island. The build-

ing is situated on a site comprising two acres. A large parking lot is provided for employees and customers.

Roll Feeds' president is William F. Herman, who has lived in Rhode Island for more than 25 years. He founded the company in 1935 with only a handful of employees. Today their number has grown to more than 100.

Others associated with the firm since its founding include Milton Pliner, vice-president and director, and Walter Adler, general counsel and director. John J. Murray is production manager, Henry Schaefer, plant superintendent, and T. Kenneth Hobson, assistant chief engineer.



## Standard Pressed Steel opens plating plant

Standard Pressed Steel Co., has opened its recently completed million-dollar plating plant to job orders from outside firms.

The plating plant was built primarily to electroplate and surface-treat SPS products. With excess capacity, however, SPS decided to go after outside work—but only the precision, close-tolerance

work for which it is geared.

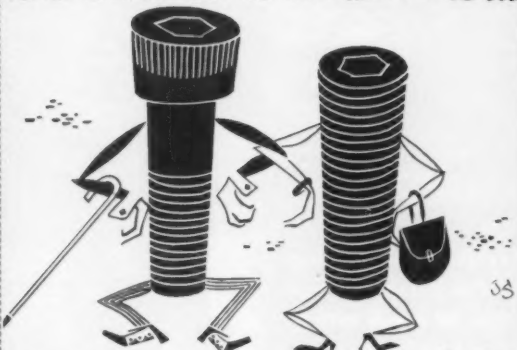
## Steel Specialties, Inc., made distributor

The Vulcan Crucible Steel Co., Aliquippa, Pa., has announced the appointment of Steel Specialties, Inc., Baltimore 5, Md., as exclusive distributor of Vulcan tool and specialty steels in that district. Technical services will also be available through Steel Specialties.

## THE MAC-IT LINE OF ALLOY STEEL SCREWS



## SOCKET SCREWS...



standard or special?

It pays to use Mac-it for all your socket screw needs—standard or special. Your Mac-it distributor will give you quick delivery on all standard sizes and will provide prompt, qualified assistance on your "special" problems. There are many other reasons why you should specify Mac-it. Consult your local distributor or write for your catalog today:



Mac-it Screw Division  
**STRONG, CARLISLE & HAMMOND COMPANY**  
CLEVELAND 13, OHIO

Mfd. by Mac-it Parts Co., Lancaster, Pa.



### New foundry, exhibit building

The Bullard Company's new Bridgeport, Conn., foundry, to cost, with equipment, approximately \$6,000,000, will be 600 feet in length, 245 feet wide, and approximately 50 feet in height. It will embody the latest developments in dust and smoke control, material handling and other equipment. New equipment recently installed in the company's present foundry will be

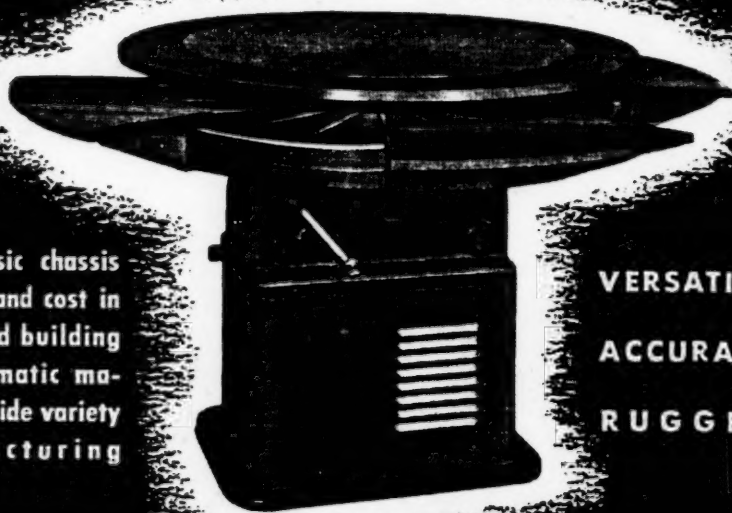


transferred to the new plant and the present foundry building will provide

# Swanson

## TURRET INDEXING UNITS

Provide a basic chassis to save time and cost in designing and building special automatic machines for a wide variety of manufacturing operations.



VERSATILE  
ACCURATE  
RUGGED

These complete\* ready-made units are available on short delivery to help solve your automation problems NOW.

\*furnished with drive and motor

ENGINEERS and BUILDERS of SPECIAL AUTOMATIC MACHINES

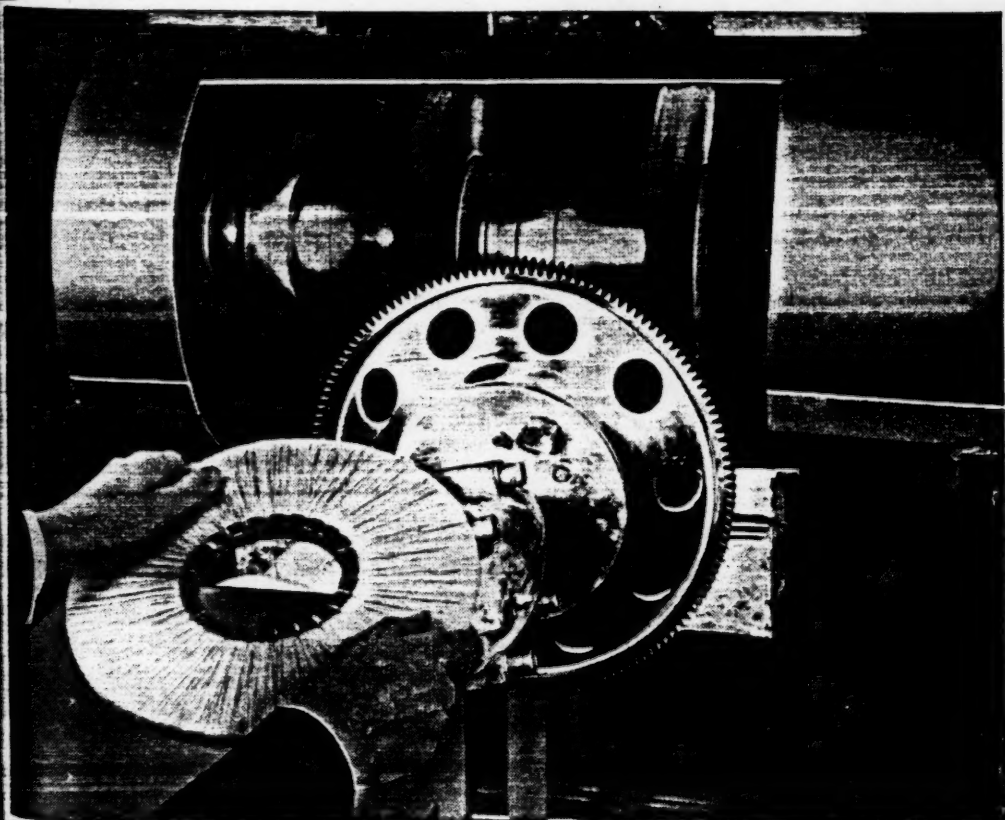
### STANDARD UNITS:

20" — 30" — 40" Turret dia.  
6 — 8 — 16 — 24 — 32 work stations.

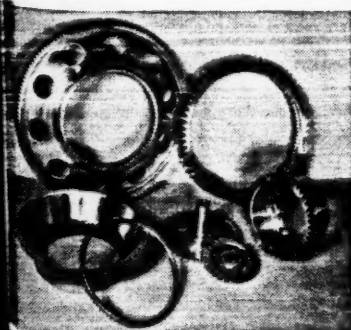
1 to 4700 indexes per hour.

• Write for bulletin TMB •

**SWANSON**  
TOOL & MACHINE PRODUCTS INC., ERIE, PA.



## Push-button brushing beats handwork 15 to 2



*What manual operations could an OBA eliminate for you?*

**7½ times as fast.** Here, Osborn Fascut<sub>a</sub> Brushes are removing burrs and blending surface junctures on spur gears. Each gear has two internal and two external gear sides that must be finished. Rate . . . 15 gears or 60 gear sides per hour. Former rate with manual method was at best two gears an hour.

Scrap has been virtually eliminated by Osborn's Power Brushing method. That's because surface quality of gears is more uniform. Stress concentrations have been eliminated by the surface juncture blending of gear teeth.

An Osborn Brushing Analysis can show you how to improve your operations through power brushing and benefit with savings like these on your cleaning, finishing and burr removal jobs. Call or write *The Osborn Manufacturing Company, Dept L-12, 5401 Hamilton Ave., Cleveland 14, Ohio.*

# Osborn Brushes



BRUSHING METHODS • POWER, PAINT AND MAINTENANCE BRUSHES  
BRUSHING MACHINES • FOUNDRY MOLDING MACHINES

## BEST COPY AVAILABLE

needed space for other company operations.

A two-story building, 200' long and 120' wide, will house foundry offices, the pattern shop, pattern storage and employee locker rooms. It is expected that the new foundry will be in operation by the end of 1955.

The company recently opened an exhibit building, illustrated, having capacity for seating 150 persons. Prod-

ucts on display are powered for demonstration.

### **Baker Bros. acquires Hall assets**

Baker Brothers, Inc., Toledo, has acquired certain assets of the Hall automotive equipment line of the Waterbury Tool Div. of Vickers, Inc.

Production of Hall valve seat grinding machines and allied equipment has

## **DEBURRING -- another SCHAUER SPEED LATHE job!**

These are versatile, economical machines for handling an almost *unlimited* variety of secondary finishing work—deburring, filing, lapping, polishing, etc.—on metal and plastic parts.



Used by leading manufacturers all over the world for increasing production UP TO 90%. Many sizes and models with chuck, collet, expanding mandrel, vacuum chuck and other holding fixtures. Speed *your* production with Schauer Speed Lathes. Get complete information today.

WRITE FOR BULLETIN 500.

**SCHAUER MANUFACTURING CORP.**

4502 Alpine Ave., Cincinnati 36, Ohio

BEST COPY AVAILABLE



only with **BARNESDRIL**  
**HONING TOOLS**  
**AND**  
**ABRASIVES**

Shell Mounted / Clamp Type



Skirt Mounted



Extra Deep

Conventional  
 Barnesdril



do you get these **FEATURES!**

**Maximum Body Support at Cutting Edge**

—freer cutting action and less spalling  
**Extended Stone Life**

—Plas-T-Clad stones are "extra-deep", provide more useable stone with positive support to the cutting edge.

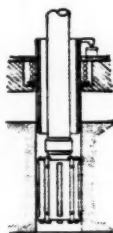
**Automatic Compensation for Stone Wear**

—Electronic Feed automatically adjusts pressure of stone against work to compensate for stone wear.

**Plugmatic Sizing for Bore-to-Bore Accuracy**

—sizes bore directly, is self-aligning, and not affected by stone wear.

Plugmatic Sizing



WRITE FOR CATALOG 500A



**BARNES DRILL CO.**

852 CHESTNUT STREET • ROCKFORD, ILLINOIS

been transferred from Waterbury, Conn., to Toledo where it will be carried on under the name Hall-Toledo.

G. V. C. Baker has been named vice-president in charge of Hall-Toledo and Milo C. Gray, formerly sales manager of the automotive department of Waterbury Tool, will be general manager.

#### Open house

The Michigan Drill Head Co., Van

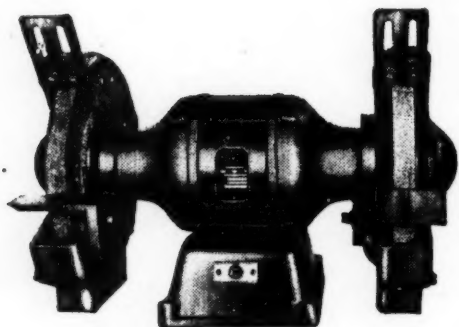


Dyke, Mich., recently held an "open house" at their new plant at 1144 Timken Ave.

Guests were conducted on tours of the entire facility, then provided with refreshments and entertainment.

# BALDOR GRINDERS

**BALL BEARING - TOTALLY ENCLOSED - HEAVY DUTY**



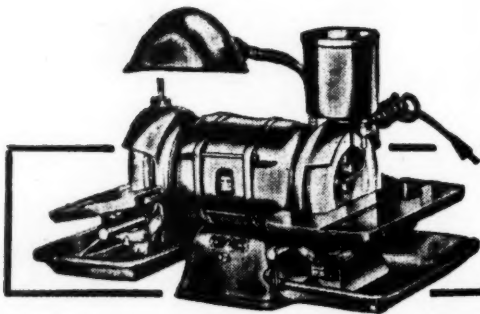
Baldor Grinders are available in bench and pedestal types with 6" to 12" wheels. Baldor Grinders are better because:

**More Rugged** — Arbor diameter  $\frac{1}{2}$ " and "sealed-for-life" ball bearing Size .05.

**More Versatile** — Wide clearance between wheels and motor frame permits grinding of large or odd shaped pieces.

Baldor is a basic manufacturer of grinders—even the motors are built by Baldor.

Baldor 10" Series Grinder  $\frac{3}{4}$  h.p., 1 phase, 60 cy., 1725 rpm, 10" wheel, \$134.00



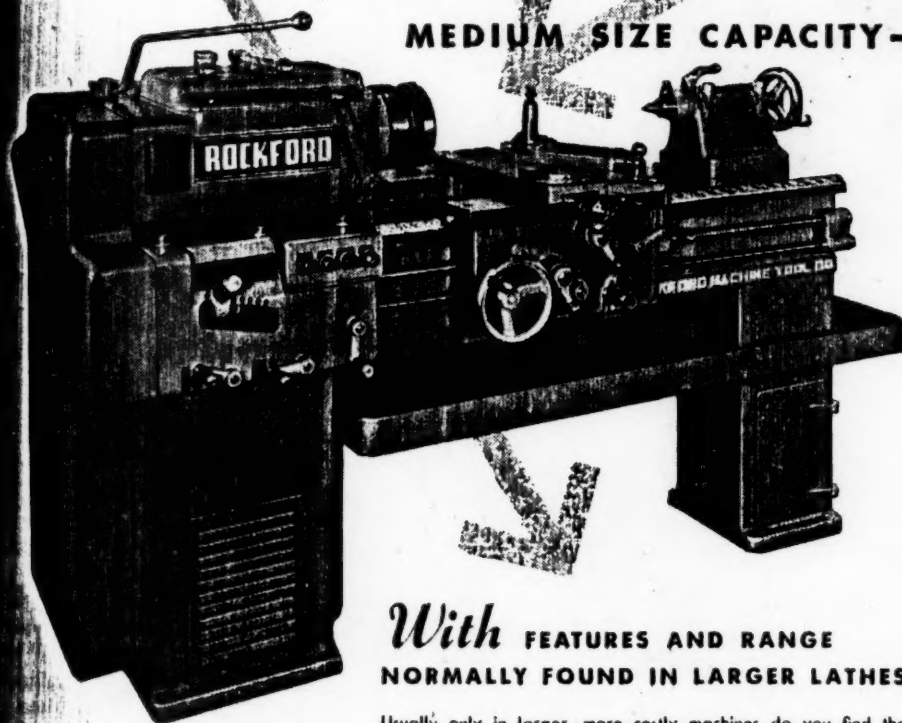
**Special Carbide Tool Grinder** built especially for sharpening carbide tools quickly and accurately. Reversible  $\frac{1}{2}$  h.p., motor withstands repeated overloads. \$149.00.

**BALDOR ELECTRIC COMPANY**  
4368 DUNCAN AVE. ST. LOUIS 10, MO.

**BEST COPY AVAILABLE**



**TOOL ROOM OR PRODUCTION—  
SPEEDS FOR CARBIDE TOOLS—  
MEDIUM SIZE CAPACITY—**



*With* **FEATURES AND RANGE  
NORMALLY FOUND IN LARGER LATHES**

Usually only in larger, more costly machines do you find the combination of speeds, swing, power, feeds and threads that are standard equipment on Rockford Economy Lathes. These features make it possible to machine a wider range of work with fewer non-productive hours than is possible with many machines in its class.

Medium-sized and economy-priced, it's built to handle any job that can be turned or threaded within 16-1/2" or 18-1/2" swing, and 30" to 102" center distance. 3100 lbs. of weight, 6' bed and zero precision bearings furnish the rigidity and precision for turning out tool room accuracy.

Ask a Rockford Machine Tool Co. representative to give you full details on these machines, or write direct for our new bulletin No. 900A.

**MEDIUM-SIZED  
ECONOMY-PRICED**

**ROCKFORD ECONOMY LATHES—16" and 18"**

**ROCKFORD MACHINE TOOL CO.**  
2500 Kishwaukee Street, Rockford, Illinois  
**BEST COPY AVAILABLE**



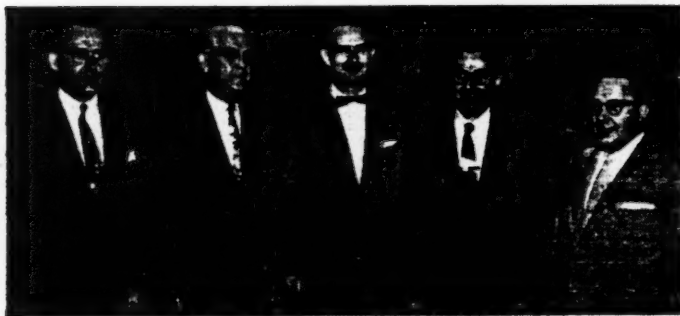
## Cleveland Crane & Eng. Co. Building in Los Angeles

The Cleveland Crane & Engineering Co., Wickliffe, O., has begun the erection of a plant at 6435 Corvette St., Central Mfrg. District, Los Angeles, to house office, warehouse, and manufac-

turing facilities.

The building will be also occupied by General Conveyor, Inc., their California Cleveland Tramrail distributor.

H. T. Florence, executive vice-president and general manager of the Cleveland Crane & Eng. Co., breaks ground for new West Coast facility. Starting at left is Edgar A. Griswold, building contractor; C. H. Saiter, sales manager of heavy machinery division; Florence; Fred Everard, Cleveland Tramrail western district manager, and P. H. Bertola, president of General Conveyor, Inc.



NTDMA officers elected at the Association's Dayton convention are (left to right): Phillip R. Marsilius, Bridgeport, Conn., treasurer; Joseph N. Huser, Indianapolis, first vice-president; Jerome H. Stanek, Milwaukee, president; Herbert Harig, Chicago, second vice-president and Harold G. Murdoch, Los Angeles, secretary.

### Sam Stern

The Action Diamond Tool Co., Chicago, has announced the death of its president, Sam Stern, on Sunday, Jan. 16, at the age of 55.

Mr. Stern migrated from Hungary about 34 years ago. He found work in this country as a diamond setter.

Twenty-five years ago, he began manufacturing diamond dental wheels and then branched out into the manufacture of industrial diamonds for defense. He held several patents for diamond abrasive wheels and tools. Mr. Stern was one of the originators of the diamond impregnated wheel for the grinding of carbide.



# the Key to Cost Control for taps!

● Buy any good taps you want, BUT — keep them the way you want them . . . sharp, accurate, and efficient . . . with the BLAKE system.

This is no dream! Cold, hard, cost-cutting facts stand behind and are re-proved by each new installation of BLAKE flute or chamfer grinders.

The Story's  
Here.



Write for these booklets.

EDWARD **BLAKE** COMPANY

DIVISION BLAKE-WAINDOLE CORP.

440 CHERRY ST., WEST NEWTON 65, MASS.

BLACK DIAMOND PRECISION DRILL GRINDERS • SURFACE FINISH STANDARDS

## Knud Engelsted

Knud Engelsted of Riverside, Conn., died December 14, 1954. He was chairman of the board and president of O. S. Walker Co., Inc., Worcester, Mass. Born in Svendborg, Denmark, 1889, he came to the United States in 1913. Interment was in Svendborg, Denmark.



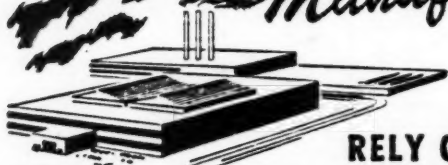
## Company name change

The name of Lehigh Foundries, Inc. has been changed to Lehigh, Inc., in order to better represent the diversification of products made by the company.

## Brown & Sharpe sells hob business

Brown & Sharpe Mfg. Co., Providence R.I., has sold its hob business to the Barber-Colman Co., Rockford, Ill. The manufacturing equipment will augment Barber-Colman's present hob manufacturing facilities.

*America's "BLUE CHIP" Manufacturers*



**RELY ON B. JAHN  
PRODUCTION PROVED DIES TO KEEP  
QUALITY UP, OPERATING COSTS DOWN!**

Manufacturers who supply millions of products — for millions of people — use progressive dies that produce with precision throughout long production runs. No chance of interrupted production, no costly breakdowns, no delays, no imperfections in die or finished piece — that's why the best known names in industry specify "B. Jahn Production Proved Dies." B. Jahn dies are painstakingly engineered for performance! Above all, every B. Jahn die is "Production Proved" in actual operation. This means up to 50,000 pieces can be run and delivered for inspection or assembly line use before the tool is shipped — a production tool warranted to operate in the customer's equipment to his complete satisfaction.



Yours on request!  
The fact-filled "Story  
of B. Jahn Production  
Proved Dies."

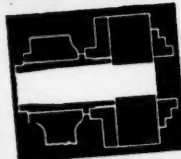
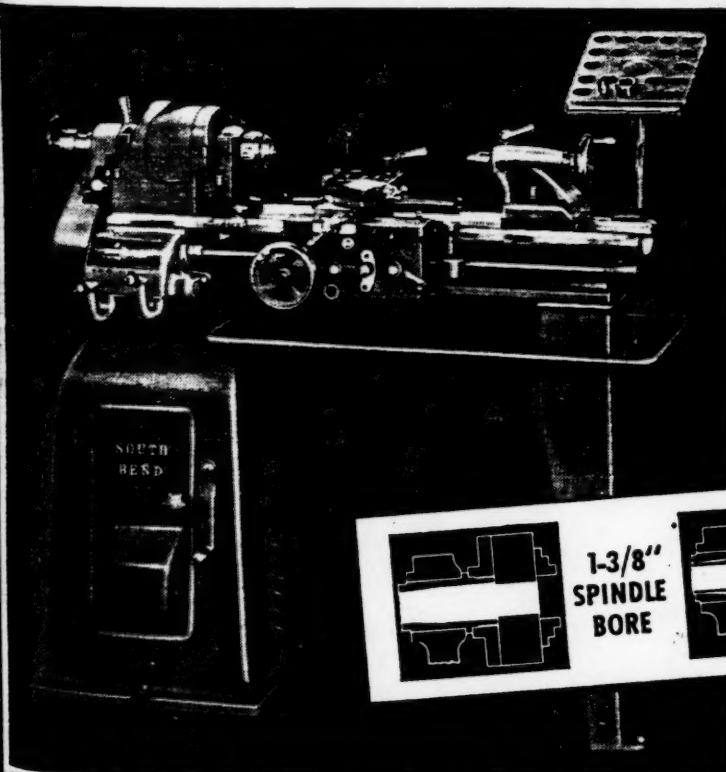
THE B. JAHN MANUFACTURING COMPANY

**B. Jahn**

NEW BRITAIN, CONNECTICUT



# SOUTH BEND 10" Lathes



1-3/8"  
SPINDLE  
BORE



1" COLLET  
CAPACITY

## SPECIFICATIONS

SWING 10 1/4" over bed and saddle wings, 5 3/4" over cross slide.  
COLLET CAPACITY.....1 in.  
SPINDLE BORE.....1 3/8 in.  
BED LENGTHS 3, 3 1/2, 4 feet.  
CENTER DISTANCES.....14 1/4 to 26 3/8 inches.  
SPINDLE SPEEDS (12) 50 to 1357 r.p.m., approximately.  
POWER LONGITUDINAL FEEDS 70 R.H. or L.H...0007" to .0836"  
POWER CROSS-FEEDS .....70 .0003" to .0303"  
THREAD CUTTING 70 R.H. or L.H. pitches, 4 to 480 per inch.

## 10" Precision TOOLROOM LATHE

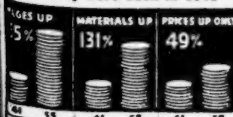
Sound design, expert workmanship and quality materials give the 10" South Bend Lathe the dependable performance you want. Equipped with a precision lead screw, thread dial indicator and thread cutting stop, you can use it with confidence for cutting screw threads, making precision gauges or turning instrument parts.

Another outstanding feature is the 1" collet capacity and 1 3/8" spindle bore which is built on the same design and specifications of larger lathes. The large spindle bore gives you lathe collet capacity in a small, compact unit.

**\$1526.00**  
f.o.b. Factory

Toolroom Lathe, illustrated, less motor and controls. Time payment terms available.

Compared with our costs  
**OUR PRICES ARE LOWER**  
than they were back in 1941



Prices are closely tied to costs. Costs are still rising. Buy now before increased costs necessitate higher prices.

### SEND INFORMATION CHECKED:



☐ 9" and 10" BENCH LATHES ☐ 10" to 16-24" FLOOR LATHES ☐ DRILL PRESSES ☐ TOOL GRINDERS ☐ 1/2" & 1" Collet TURRET LATHES ☐ 7" BENCH SHAPERS

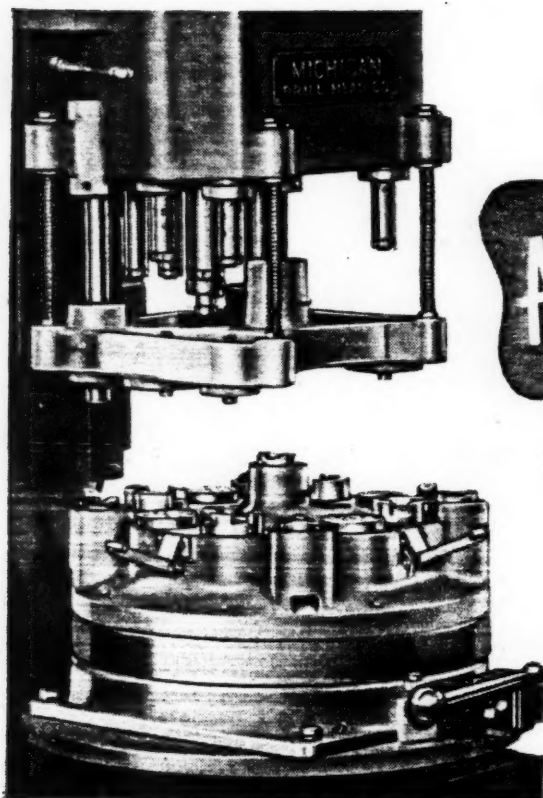
Name \_\_\_\_\_ Street \_\_\_\_\_

City \_\_\_\_\_ State \_\_\_\_\_



Building Better Tools Since 1906 • SOUTH BEND LATHE • South Bend 22, Indiana

**BEST COPY AVAILABLE**



You can do

**AMAZING**

**THINGS**

on a small  
drill press

**YES**

you can drill, ream and finish bore pressure plates for hydraulic pumps, on the drill press pictured above.

Here's a nine spindle drill head bushing plate and fixture and, a four-station hand operated index table—mounted on a Michigan Hydro 3 Drill Press. It's really amazing!

We also invite your inquiries as to our line of tapping units, and index tables—both manual and automatic—catalog sent on request.

**Michigan**

**DRILL HEAD CO.** Detroit 34, Michigan  
engineers and manufacturers of production machines and drilling equipment



Arthur H. Starrett, president, L. S. Starrett Co., Athol, Mass., was recently tapped with the Lafayette leadership baton, a ceremony honoring him for "devotional duty to country and community." Left to right, W. E. Nickerson; W. G. Lord; F. C. Snyder; Starrett; W. E. Nemo.



**for press room flexibility...**

**LITTELL**

mobile, self-powered feeding  
and straightening machine



Used with any hand-fed press or square shear, this machine instantly provides automatic straightening and feeding. These Littell machines operate independently of using equipment, supply their own smooth, hydraulic power. There is only a simple electrical connection between units, permitting easy reconversion to hand feeding. The machines feed up to 19" lengths at 40 strokes per minute and handle any coil stock up to .125" thick and 24½" wide. Pacemaker control automatically synchronizes feed and press action. Write for Catalog 6-U, giving full details.



ROLL FEEDS • COIL CRADLES  
STRAIGHTENING MACHINES  
REELS • AIR BLAST VALVES  
District Offices: Detroit, Cleveland

4147 N. RAVENSWOOD AVE., CHICAGO 13, ILL.





Every drill you grind on a  
**SELLERS Drill Grinder**  
cuts exactly like a new one!

**CONSOLIDATED MACHINE TOOL COMPANY**  
**ROCHESTER, NEW YORK**

A DIVISION OF FARREL-BIRMINGHAM COMPANY, INC.

**PUNCHES TO MEET  
ALL NEEDS**

**UNIVERSAL PUNCHES**

... 4 Sizes, 120—150—235—300 tons, 18½ and 28½" throat

**SINGLE END PUNCHES**

... 7 sizes, 25 to 760 tons

**HORIZONTAL PUNCHES**

... 2 sizes, 55 and 120 tons

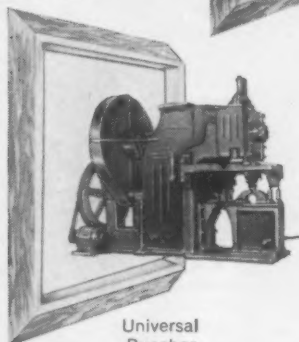


Kling  
Single End  
Punches

Typical of Versatile Kling Metal Working Machines

nearly **50**  
**Different**  
***Kling***  
**Punches**

**To Help You Cope With Today's  
Changing Production Conditions**



Universal  
Punches

Yesterday's machines will not meet today's new conditions. Kling, with more than 60 years' experience, is constantly designing, developing and improving new-type, more advanced metal-working machines to meet these new situations.

Write for bulletins

**THERE ARE 3 SIZES  
OF THE KLING COMBINATION  
TO MEET VARYING PRODUCTION  
REQUIREMENTS**

**PUNCHING CAPACITY**

<b>No. 3</b>	11/16" through 1/2"
	13/16" through 3/8"
<b>No. 4</b>	13/16" through 3/4"
	15/16" through 5/8"
<b>No. 7</b>	1-5/16" through 1"
	1-7/16" through 7/8"

In addition to punching, this "jack-of-all-jobs" does a dozen other operations with standard and special attachments.



Kling  
Combination  
Shear, Punch  
and Coper

720 MT

***Kling***

**... an investment in speed!**

**MANUFACTURERS OF:** Combination Shear, Punch & Copers • Double Angle Shears • Rotary Shears • Punches • Plate Bending Rolls • Angle Bending Rolls • Friction Saws

**KLING BROS. ENGINEERING WORKS** 1320 N. Kostner Avenue, Chicago 51, Ill  
Export Distributors: Simmons Machine Tool Corp., 50 E. 42nd Street, New York 17, N. Y.

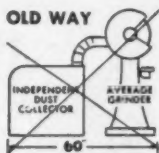
*Hammond*  
OF KALAMAZOO

# 2 IN 1 NO-DUST GRINDER



SAVE OVER 50% FLOOR SPACE  
THE HAMMOND WAY

OLD WAY



**DUST-LADEN AIR IS A MENACE!**

- Protect your employees' health.
  - Protect nearby machine tools from dust and grit.
  - Save floor space — requires only 6½ square feet.  
For 10", 12", and 14" wheels.
- Write for Catalog.

*Hammond Machinery Builders* INC.

1614 DOUGLAS AVENUE • KALAMAZOO 54, MICHIGAN

## "LATHEDOG" USES THE TAPER TURNING ATTACHMENT

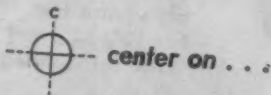
WHAT IS  
**LATHEDOG**  
DOIN' WITH  
ALL THEM  
PENCILS?

HE'S USIN' THE TAPER  
TURNING ATTACHMENT  
ON THE NEW  
**CININNATI**  
TRAY TOP TO  
SHARPEN THEM  
FOR THE NEW  
WAITRESS  
IN THE  
CAFETERIA!

BOY! WHAT PRECISION!  
TURNS THE POINTS  
DOWN TO  $\pm .00001$   
WITHOUT BREAKIN'  
A SINGLE LEAD!



J.R. WILLIAMS



# cinnati

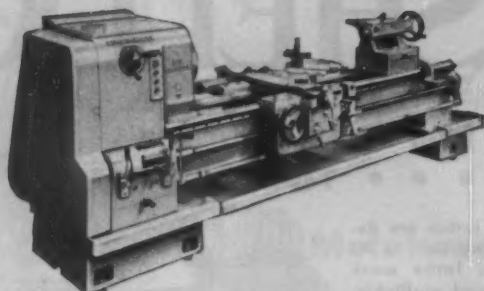
**WILLIAMS**

THAT NEW  
WAITRESS  
AIN'T GONNA  
THANK  
**LATHEDOG**  
FOR GETTING  
CUTTING  
OIL ALL  
OVER HER  
PENCILS!



Copyright, 1955 by NEA Service, Inc.

Large size prints of this  
J. R. Williams cartoon are  
available for framing.



Lots of folks who know about Cincinnati Tray-Tops don't know that every size has a full set of accessories available. And even more folks don't know that the famous Tray-Top line has been expanded to include a 21½" and a 26" size. Tray-Tops are the low-priced lathes with the high-priced features:

1. All geared headstock
2. 12 spindle speeds in geometric progression
3. Direct-reading, speed-shifting mechanism
4. Large spindle mounted in three antifriction bearings
5. Flame hardened gears in headstock, quick-change box and apron
6. Cabinet legs on the 10", 12½", 15" and 18" sizes
7. Enclosed quick-change box with lead screw reverse
8. One shot lubrication of the ways
9. Ground ways (flame hardened at extra cost)
10. Tray-Tops on headstock and tailstock
11. One piece, double-walled apron with automatic lubrication
12. Fully enclosed electrical panel, built-in disconnect, transformer, motor and controls (all standard equipment)
13. Complete operating and service manuals
14. Built-in leveling jacks

We also make a complete line of floor, bench and radial drilling machines.

For complete catalogs, prices and the name of your local dealer, write on company letterhead to Cincinnati Lathe & Tool Co., 3255 Disney, Cincinnati 9, Ohio.

# lathes and drills





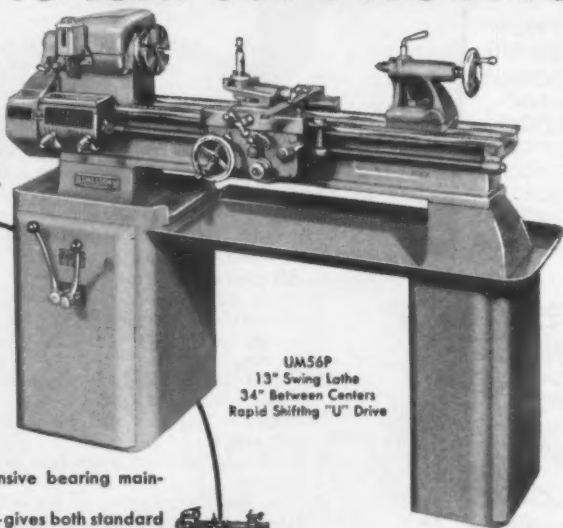
# SHELDON

CHICAGO U. S. A.

**BUILT**

• • • to Turn out **PROFITS**

Sheldon Lathes are designed and built to do accurate lathe work rapidly and profitably. Moderate in price they have the collet, swing and power capacity to do most toolroom work.



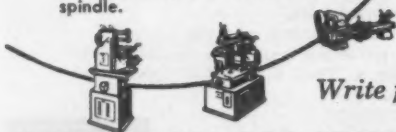
UM56P  
13" Swing Lathe  
34" Between Centers  
Rapid Shifting "U" Drive

## Design Features:

- Large and wide "Zero Precision" Tapered Roller Spindle Bearings—permit operation at all speeds, retain accuracy, and expensive bearing maintenance costs.
- 54-pitch Gear Box—gives both standard and many hard to get thread ratios.
- Large Micrometer Dials—Make accurate operation easier.
- Extra Collet Capacity—1 3/8" hole through spindles available on 10", 11" and 13" swing lathes.
- More Power to Spindle—Efficient drives with bigger motors and double neoprene cog V-belts to spindle.

## OPTIONAL FEATURES AT EXTRA COST

include: Hardened ways, Long Tapered Key Drive Spindles, 4" D1 Camlock Spindles bed turrets, collet attachments, and other production and toolroom accessories. Lathes available with a choice of "Bench," "Cabinet" or "Pedestal" mountings.



Write for New Catalog G-55

# SHELDON MACHINE CO., Inc.

4242 N. Knox Ave.

Chicago 41, Illinois

"See our display at the Western Metal Show, Booth 614"





*What's*

**new**

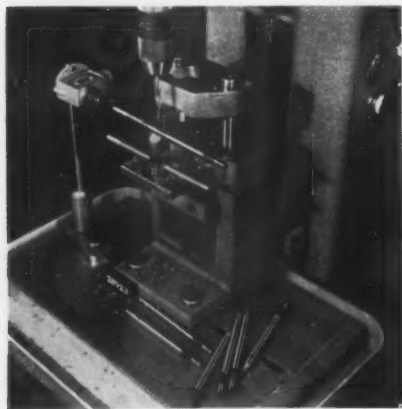
**in Metalworking**

## **Air Operated Universal Clamping Fixtures Have Built-in Pressure Regulator**

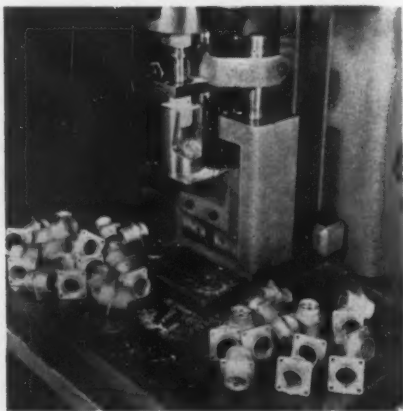
No 8 and No. 9 universal clamping fixtures, made by Snow Manufacturing Co., Dept. BB, 435 Eastern Ave., Bellwood, Ill., are air operated and develop

148 lb. and 276 lb. clamping pressure respectively on 100 lb. line pressure. A pressure regulator is built into the machine to provide adjustment of de-

**Figure 1**



**Figure 2**



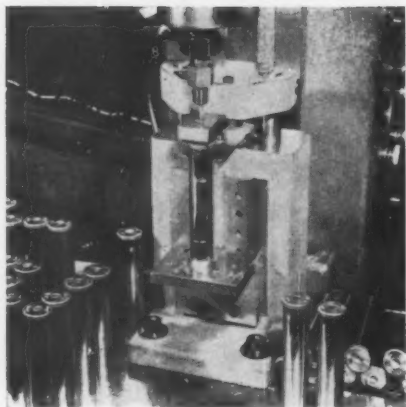


Figure 3

sired clamping power. Blank studs and top plates are carried in stock in various sizes.

The use of a double slotted stud for holding round stock in preference to the usual V groove is claimed to allow a firm grip on the knife edges. The retaining walls project slightly above the center line of the round stock, thereby preventing any climbing action of the part during the break-through of the drill. This eliminates excessive tool wear and breakage.

Figure 1 is a cross-drilling operation on a shaft. The tooling consists of one of the standard studs and bushing plates tooled to permit the insertion of the part to contact a micro switch which initiates the spindle cycle and synchronizes the clamping action of the fixture. As soon as the cycle is completed, the part is ejected by the spring loaded contactor.

Figure 2 is a similar type of tooling on a stud for boring the ID of the part shown. The worktable can be adjusted in height to permit adaptation to larger or longer parts.

Figure 3 shows a simple locator button used in conjunction with a V plate

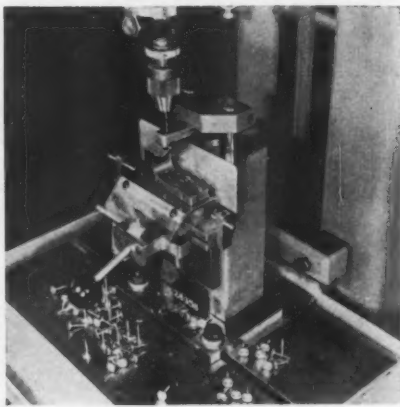


Figure 4

for positioning a shell case for drilling the primer hole.

Figure 4 shows a sliding base adaptation for handling multi-holes in parts. The work holder varies with the type of part, but the base is standardized. Proper position is obtained with the stops on the slide base, while the clamping and drilling cycle is synchronized by lifting the lever into the accurate spacing notch on the cross bar to contact the micro switch.

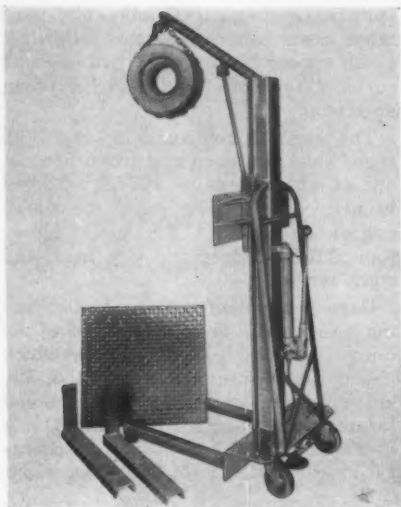
Use ACTION Card, opposite page 64. Encircle No. 1

### Improved boom attachment for hydraulic lift

An improved mechanism requires only finger-tip pressure for attaching and detaching the shop boom to a Unit "3-in-1" hydraulic lift. Fork and platform lifting mechanism is enclosed for operator safety.

The boom, which has a capacity of 500 lb., can be mounted or removed in less than a minute. Boom eye moves from 47½" to 87" above floor level.

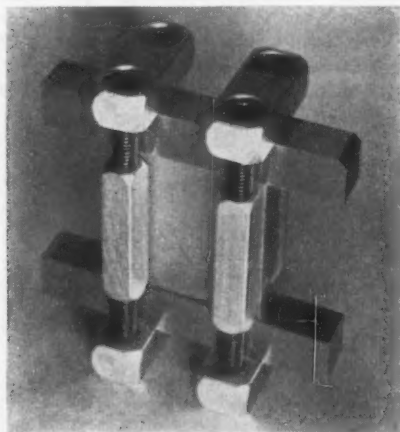
Hydraulic power is provided by a hand pump and cylinder. The fork and platform each have a capacity of 750 lb. and lift up to 55" above floor level.



Lift will operate in aisles as narrow as 26". A safety foot brake is standard equipment. Unit Mfg. Co., Dept. BB, 69 S. 13th St., Minneapolis 3, Minn. Use ACTION Card, opposite page 64. Encircle No. 2

### Convertible built-up snap gage

The purpose of the Mechanical Products convertible built-up snap gage



FOR  
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ALIGNMENT



**UNIVERSAL**  
**DRILL BUSHINGS**

**UNIVERSAL  
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COMPANY**

**FRANKENMUTH 10,  
MICHIGAN**

178-B

## Balancing Tools for a Wide Range of Work



Here's a complete line of Balancing Tools which will save their cost quickly on balancing or truing operations. Accurately sensitive and durable, they provide a simple, reliable means for checking the balance of parts like gears, shafts, fly wheels, pulleys, etc. The standard sizes available are shown in capacity chart below.

### CAPACITIES

Swing	Between Standards	Weight Capacity
21 in.	20 in.	12 lbs.
21 in.	20 in.	800 lbs.
43 in.	29 in.	800 lbs.
43 in.	29 in.	2,000 lbs.
6 ft.	5 ft.	5,000 lbs.
8 ft.	8 ft.	10,000 lbs.
Any	Any	24,000 lbs.
43 in.	30 in.	800 lbs.

### FREE DATA



You can obtain complete information on Sundstrand Balancing Tools by writing for bulletin 454.



**SUNDSTRAND MACHINE TOOL CO.**  
2535 Eleventh Street, Rockford, Ill., U.S.A.

(patent pending) is to eliminate gage labor costs other than the following: finish spacer block; grind two opposite surfaces on both anvils; grind tolerance step.

The gage is composed of two high speed steel hardened and ground anvils, one of which contains the conventional broken corner to designate the no-go end of the gage; a C.R.S. spacer block; four C.R.S. bridges and side bars, and eight screws.

Gage is supplied in four sizes covering a range of 0 to 1.968 inc. Use of the four sizes establishes a system which lends to the interchangeability of the anvils, bridges and other parts. A and B sizes have  $\frac{1}{4}$  square anvils and C and D sizes have  $\frac{3}{8}$  square anvils. Mechanical Products Co., Dept. BB, Waterbury, Conn.

Use ACTION Card, opposite page 64. Encircle No. 3

### Eight-watt fluorescent work light

Twin 8-watt fluorescent lamps of the Lite-Mite work light give 150 foot candles of cool, diffused light.

This compact light is easily adjusted to any height, extension or location. Sturdy, all steel construction withstands vibration and shock. Can be used for factory bench, machines, critical work areas; easily mounted vertically or horizontally. Stocker & Yale, Inc., 22 Green St., Marblehead, Mass.

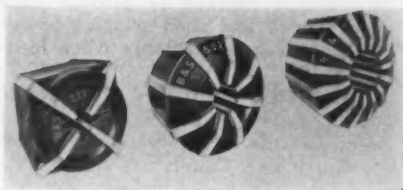
Use ACTION Card, opposite page 64. Encircle No. 4



### Steel inserts of collets imbedded in rubber

Rubber-Flex collets for Brown & Sharpe No. 0, OG automatic screw machine and No. 0 hand screw machine eliminate the need for a collet for each size round stock as each collet has a nominal range of .050". A set of thirteen collets covers the spindle capacity of the machine from .100" to .750".

Each collet requires a chuck nut and



two chuck sleeves to deliver its entire capacity range. The rubber-flex con-

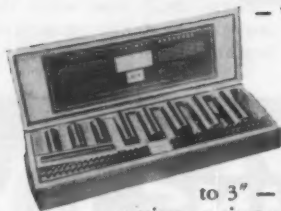
**KEYWAYS  
QUICK!**

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as  
one  
minute  
per  
keyway

**KEYWAYS  
CHEAP!**

as  
little  
as  
one  
penny  
per  
keyway

- with *Minute Man*



### KEYWAY

### BROACH KITS

Cut any size keyway from  $\frac{1}{16}$ " to 1" in any bore from  $\frac{1}{4}$ " to 3" — by hand, with arbor press. Save setting-up time on a big, expensive machine tool.

### SQUARE HOLES, TOO!



### *Minute Man*

High Speed Square Broaches finish cast or drilled holes in one pass. Available from stock at your Industrial Distributor's for  $\frac{3}{16}$ " to  $\frac{3}{4}$ " squares.

**The du MONT CORPORATION, Greenfield, Mass.**

**Mail Free BROACH CATALOG and PRICE LIST 1 to**

Name .....

Company .....

Address .....



struction is claimed to provide close concentricity and good gripping power. The units release instantly when feeding stock.

As the steel inserts are imbedded in rubber, slots are not required in the collet and the faces are sealed against the chuck nut. Collets are suitable for round stock only, and for second operation work where the length of the piece inserted in the collet utilizes its full surface. Brown & Sharpe Mfg. Co., Providence 1, R.I.

Use ACTION Card, opposite page 64. Encircle No. 5

### New products developed

Four new products have been announced by Adamas Carbide Corp., Dept. B, Kenilworth, N. J.

#### Premium carbide grades

The following premium grades have been developed for applications where extremely difficult machining operations are involved: Grade 434—for steel

roughing cuts with heavy feeds; Grade 548—a hard finishing grade capable of withstanding shock; Grade GG—for interrupted cuts on steel where extreme shock and vibration are encountered; Grade 474—shock resistant grade with greater wear resistance than GG.

#### Preformed helical blades

Preformed blade has a helix formed in the face and a helical clearance formed on the top of the blade. Back and bottom of the blade are flat so it can be brazed into a straight axial gash pocket.

A constant radial rake for the entire width of the cutter is maintained. In slab milling operations, smoother cutting action and better chip control is claimed.

#### Drill tips for twist drills

These drill tips were designed especially for drilling cast iron and non-ferrous materials. They have a new



# DOWEL PINS

*Immediate  
Delivery!*

Standard Size Dowel Pins from  $\frac{1}{8}$ " to 1" diameter and from  $\frac{3}{8}$ " to 6" length supplied in .0002" and .001" over basic sizes. Unless otherwise specified, .0002 oversize will be furnished.

*Dealer inquiries invited.*



## SCHULTZ & ANDERSON CO.

111 EDISON PLACE, NEWARK 5, N.J.

flute shape to blend with the 15° helical flute shape of the drill body, providing maximum steel support behind the tip.

#### Preformed hob blanks

A new manufacturing technique permits preforming of carbide blanks for hobs to very close tolerances, eliminating much grinding on the part of the hob or cutter manufacturer. The blanks are preformed with necessary clearance and lead angles.

Use ACTION Card, opposite page 64, Encircle No. 6

#### Radius dresser spindles improved

Sperman Metal Specialties, 1085 Rogers Ave., Brooklyn 26, N.Y., has developed a spring loading for the spindle of the Mighty Midget radius dresser that is claimed to cut out practically all chatter. This feature means that fewer passes will be required to cut a radius on a grinding wheel and that the dressing diamond will last much longer.

The spring loaded spindle can be put

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**SAW BOX**

**FOR 100 FOOT COILS!**



- **SAFE**—No ends sticking out. Won't come apart. No sharp box edges. Saw can't tangle or crush. Won't rust.
- **CONVENIENT**—Unwinds and recoils with ease. Visually indicates remaining footage. Easy to identify for type and size of saw by color and code.
- **INFORMATIVE**—Box copy defines types of blades, has a radius chart for contour sawing and other helpful saw recommendations.

**W.O. Barnes**

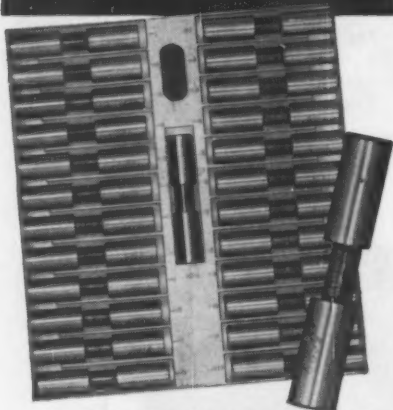
**CO., INC.**

FAMOUS FOR QUALITY

1307 TERMINAL AVE. - DETROIT 16, MICH.

ESTABLISHED 1919

## CLOSER PRODUCTION TOLERANCES!



### DELTRONIC Tenth Plug Gauges

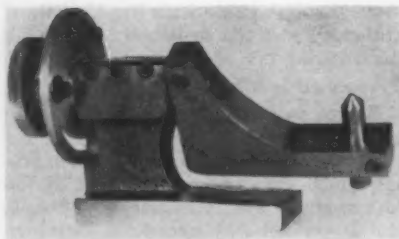
*save time and material, too!*

This new system of precision gauging in sets of 25 provides one gauge of nominal size plus 12 gauges of increasingly larger sizes in .0001" increments and 12 gauges of decreasingly smaller sizes in increments of .0001".

- ★ Size variation by ten thousandths
- ★ Available in increments of 1/64" from 1/8" to 1"
- ★ Set of 25 costs approximately same as Go and No Go gauge
- ★ Hardness is Rockwell C62/C64

*For further information write Dept. D.*

**DELTRONIC  
CORPORATION**  
1507 RIVERSIDE DRIVE  
LOS ANGELES 31, CALIF.



in older model Mighty Midget radius dressers by sending the tool back to the factory.

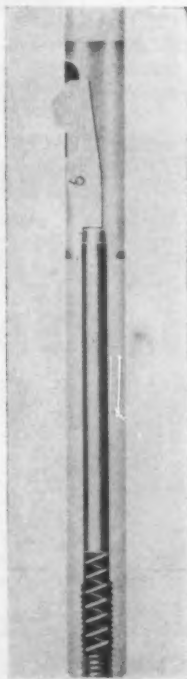
Use ACTION Card, opposite page 64. Encircle No. 7

### Deburring tool used on both top and bottom of hole from one side

The BurrAway tool is claimed to provide a convenient and easy method for removing burrs, fins and other hole irregularities, since they can be removed on both the top and bottom of a hole from one side, thus eliminating the necessity of reversing the part.

When used in multiple spindle machines, a hand operation or secondary operation is eliminated.

Cutter blade is retained in a slot in the body of the tool. A spring-loaded plunger holds the cutter blade in the open ready-to-cut position. The front or rear



angle of the cutter blade will not function until it contacts either the top or bottom edge of a hole, a valuable feature where irregular thickness and positioning of the part is concerned.

When the feed-cutting load exceeds the pre-set spring pressure, the blade continues to collapse under feed until it stops cutting. The edges on the top of the blade being rounded, there is no serious injury to the finished hole

surfaces. No burrs remain in the hole to interfere with assembly of component parts. Cogsdill Tool Products, Inc., Dept. BB, 12980 W. Eight Mile Rd., Oak Park 37, Mich.

Use ACTION Card, opposite page 64. Encircle No. 8

#### Tap extension

The Walton Co., Dept. BB, Box 5, Elmwood Branch, West Hartford 10, Conn., has acquired manufacturing and selling rights to the Allen tap exten-



**"BEST \$1286 WE  
EVER SPENT!"**

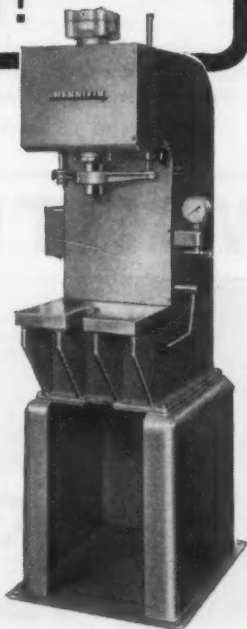
### That's the price of this 5-Ton HANNIFIN Press\*

A lot of production men have made such comments about this versatile little hydraulic press.

They like the way you can adjust it to the exact force you need for each job, all the way from 1 ton to 5 tons. The backstroke is adjustable, too, so the ram just clears the work on any job. Fast-acting controls. Prompt delivery from stock.

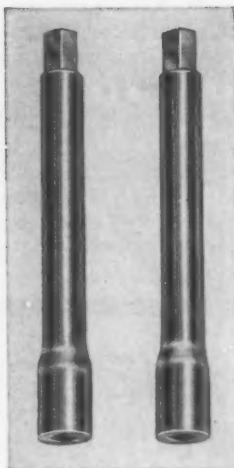
**WRITE.** Complete information and prices on the Hannifin line of 1- to 10-ton Hydraulic Presses will be sent on request.

\*Price complete with motor and starter F.O.B. our press plant, St. Marys, Ohio, subject to change without notice.



# HANNIFIN

Hannifin Corporation, 529 S. Wolf Road, Des Plaines, Illinois



sions, formerly produced by The Allen Mfg. Co., Hartford. These are now known as the Walton tap extensions.

Tool is useful in places where it is

difficult to turn a tap wrench without lengthening the tap. Extensions are packaged as a set of two 5" units which can be used singly or in combination.

They are made in a range of sizes to fit all standard taps from No. 10-3/16" to 1".

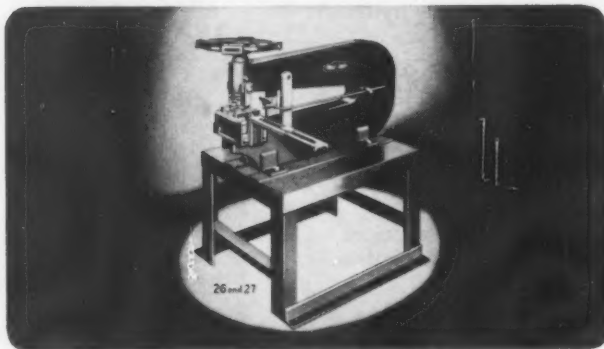
Use ACTION Card, opposite page 64. Encircle No. 9

### Vibratory lapping-polishing machine

A new lapping-polishing machine



# WHITNEY-JENSEN



Nos. 26 - 27

## PUNCHES

The ball-bearing screw press principle is here applied to a large-hand-operated punch mounted on a sturdy floor stand. Full throat depth for work in sheets; with tie-plates, throat depth is decreased and capacity increased. Capacity, full throat depth, mild steel (No. 26) 2" thru 3/32"; (No. 27) 2" thru 1/16". Capacity with tie-plates, 1/2" thru 3/8", both models. Send for our new catalog.

## WHITNEY METAL TOOL CO.

45 Years Experience

115 Forbes Street, Rockford, Illinois

provides a mechanical method for lapping and polishing metallurgical samples, metallic sealing ring faces, and other metal parts requiring a highly polished surface.

Samples for electron microscope or brush analyzer examination can be finished in quantity in one-third the time necessary to produce one sample by hand, the manufacturer claims.

Vibrating bowl can be lined with whatever polishing cloth is desired for a specified finish. Finger-tip control of vibration regulates polishing speed. Available in models with bowl sizes from 5" to 24" in diameter. Syntroon Co., Dept. M, 300 Lexington, Homer City, Pa.

Use ACTION Card, opposite page 64. Encircle No. 10

### Grinding segment adhesive

Grinding segments can be reclaimed in your own plant by using a new ad-

hesive recently developed by Chemical Development Corp., Dept. BB, Danvers, Mass.

Called Gaff Bond 334, it is simply applied to the surface of the stones. The segments are clamped together with two C clamps for 48 hours, then returned to the grinder for reuse. No heat or pressure is required.

Use ACTION Card, opposite page 64. Encircle No. 11

### Fixture for sharpening and measuring circular form tools

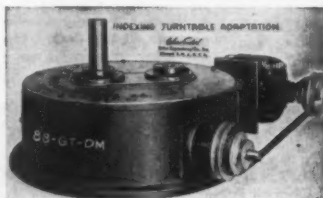
A micrometer grinding fixture for setting the proper offset when sharpening circular form tools used in automatic screw machines and recessing tools has been announced by Scully-Jones and Co., Dept. MTB, 1901 S. Rockwell St., Chicago. Fixture is designed for use on any toolroom surface grinder having a magnetic chuck, or (by bolt-

(Continued on page 270)

## INDEXING TURNTABLES AND POSITIONERS



C  
A  
M  
S



Eisler makes over 100 different types of indexing mechanisms for spraying, glass insulators, melting and glass glazing with rotating stations and motorized or hand operated. Rotating tables of all kinds for over 35 years. We supply any part or complete equipment and we make special turntables and cams to your specifications. You are invited to see our showroom and see for yourself our many models on display. Write or call for our new catalog No. 88-55.

**CHARLES EISLER JR., PRESIDENT**  
**EISLER ENGINEERING CO., INC., 762 So. 13th Street, Newark, N. J.**

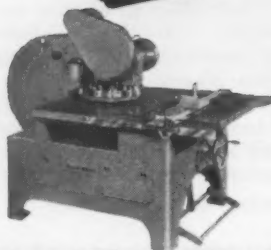


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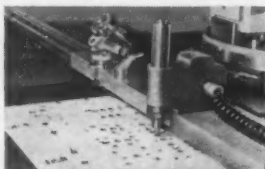
**WIEDEMANN**

**The RA-41P Turret Punch Press  
Pays for itself  
in 2 YEARS or LESS**



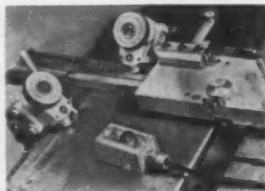
**Save 90% on  
PIERCING**

- Unmatched for high speed, low cost duplication of intricate hole patterns in flat sheet metal—low to medium production quantities.
- 18 or 20 punches and dies in turrets ready for use.
- Hole locations are made to a color-coded template—50 or more holes per minute.



**Save 90% on  
TEMPLATE  
MAKING**

- Press can be supplied with optical dimensioning instruments for template making.
- These templates are used with the RA-41P as well as for other applications. Drill jigs, prototypes, etc. are also produced to a tolerance of  $\pm .002''$  in 10% of the time usually required.



*Wiedemann ships each press tool—ready to produce your parts as soon as the machine is leveled and connected to your power line.*

*Wiedemann engineers will be pleased to study your drawings and show how these savings can be yours.*

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OF BULLETIN 241**

**WIEDEMANN MACHINE COMPANY**

**4285 Wissahickon Avenue, Philadelphia 32, Pa.**



## Literature

### CATALOGS AND BULLETINS

#### AVAILABLE FROM MANUFACTURERS

For copies of the literature in which you have an interest use the postage-paid postcard on the next page. Merely circle the identifying number and mail the postcard.

1. **Air Collet Closer.** Leaflet available from Wilson Air Collet Closer, Inc., Dept. BB, 909 40th Ave., N.E., Minneapolis 21, Minn., describes new air collet closer which company claims will give 20%+ increase in lathe production. Features: fins for dissipating heat more rapidly; non-stop lathe production on first or second operation work; no adjustments for stock or part variations; consistent accuracy through controlled pressure on work.

2. **"What you should know about Buying and Renting Machine Tools."** Gisholt Machine Co., 1221 E. Washington Ave., Madison 10, Wis., has issued a new booklet designed to help buyers of machine tools and other industrial equipment select the method most suitable for their particular case. The booklet discusses leasing and time payment plans, makes cost comparisons, discusses depreciation under the new tax codes, and machine replacement programs.

3. **Hardchrome Plating on ferrous and non-ferrous metals.** Bulletin No. 1 is the first of a series which will be issued quarterly by the Hardchrome

Electro Processing Corp., Dept. MB, 10 Vandewater St., New York 38, N.Y. It contains valuable reference data for machinists and tool people interested in precision plating.

4. **Air and Hydraulic Cylinders,** valves and packaged fluid power devices. Information on complete line of Modern-air Corp., Dept. BB, 400 Preda St., San Leandro, Calif., is given in a new 14-section, loose-leaf catalog and data book published by the company. This 120-page manual contains complete operating data, dimensions, optional mountings, etc.

5. **"Machining Aluminum."** New 4-page bulletin, written in non-technical language and supplemented with illustrative line drawings, covers such specific problems as types and shapes of tools, preparation of drills, tool materials, tapping and threading, reaming, spinning, etc. Available from Metallurgical Dept., The George Sall Metals Co., Inc., Dept. MTB, 2308 E. Butler St., Philadelphia 37, Pa.

6. **Lubrication Field Reports,** Nos. 136 and 138, available from the Alpha Corp.,

Dept. BB, 65 Harvard Ave., Stamford, Conn., cover the use of Molykote, Type G, in the lubrication of parts and sub-assemblies of office machinery, and typical particle sizes of molybdenum disulfide products.

**7. Relay Steels.** Revised technical data sheet describing No. 2, No. 2SS, and No. 5 relay steels. Includes information on applications, magnetic properties as indicated by graphs of hysteresis loops and magnetization curves, and physical properties. Advertising Dept. MB, Allegheny Ludlum Steel Corp., 2020 Oliver Bldg., Pittsburgh 22, Pa.

**8. Coated Abrasives.** A 60-page "Production Digest" of authoritative papers on coated abrasive grinding and polishing techniques. Published by Behr-Manning Corp., Dept. MTB, Troy, N.Y., to "help industry solve modern grinding and polishing problems and suggest new and practical methods."

**9. Deburring & Chamfering Tools.** Booklet available from Cogsdill Tool Products, Inc., Dept. BB, 12980 W. 8 Mile Rd., Oak Park 37, Mich., outlines various applications, methods, and procedures concerning the use of "Burr-Away and BurraMatic Tools." Also available is a leaflet describing "Bearing-izing," a process for surface finishing and sizing holes, concentric flat surfaces, round shafts, etc.

**10. Milling Machines.** An attractive catalog, No. M-1871, describing a new line of HyPowermatic milling machines, is available from the Cincinnati Milling Machine Co., Dept. BB, Cincinnati 9, Ohio. These new millers are built in plain and duplex styles and replace the Hydromatic line.

**11. Cast Alloy Cutting Tools.** Crobalt, Inc., Dept. MTB, 2800 S. State St., Ann Arbor, Mich., has issued a new 8-page

catalog, No. 55, covering their complete line of tool bits, cut-off blades, inserts for vertical toolholders, and special inserted-tooth milling, boring and reaming blades.

**12. Broaching Machines.** Complete details and features of the latest dual-ram broaching machines designed by Colonial Broach Co., P.O. Box 37-B, Harper Station, Detroit 13, Mich., are available in a new 4-page bulletin, RT-54.

**13. Stainless Tubing and Pipe.** A new 36-page catalog on fabricating and working stainless tubing and pipe has been issued by the Alloy Tube Div., Dept. BB, The Carpenter Steel Co., Union, New Jersey. Eleven types of fabrication are described separately, supplemented with drawings and photographs.

**14. Sanding and Polishing Machines.** A 4-page bulletin, giving complete details and prices of their complete line of sanding and polishing machines and attachments, is available from The Nedco Co., 90 Rumford Ave., Waltham, Mass.

**15. "Investment for Jobs"** is designed to help answer the many questions people are asking regarding unemployment. Because of the expanding population, improvements in efficiency, and the decline of some industries, many new jobs must be created in the years ahead. How many, and how much money investment does it take to create the average job? What is the employment outlook? These and many other questions are answered in the report available from the Chamber of Commerce of the U. S., Washington 6, D.C. Price 50 cents.

**16. "There's Gold in Them Thar Barrels,"** a 10-page manual on barrel fin-

ishing describes the basic steps involved in making trial processing runs, makes recommendations for selection of media and compounds, lists 11 "Honite" brand compounds and their uses, etc. Available from Minnesota Mining and Manufacturing Co., Dept. AB5-7, 900 Fauquier St., St. Paul 6, Minn.

17. "Weldments for Industry." New 4-page illustrated brochure presents several examples of how industry is better served by using weldments. The pictures illustrate how various weldment problems up to 25 tons were solved. Available from H. F. Butler, Inc., P.O. Box 121-74, Union, N.J.

18. Gear Hobber. An 8-page bulletin LH-54 just released by Michigan Tool Co., 7173 E. McNichols Rd., Detroit 12, Mich., gives complete details of their new Model 1445 ultra-speed gear hobber. One entire section in the bulletin shows the adaptability of the hobber to automation.

19. Milling Cutter Arbors. An 8-page bulletin covering their complete line of milling cutter arbors is available from Lovejoy Tool Co., Inc., 136 Main St., Springfield, Vermont. Arbors are made of alloy steel, heat treated for maximum toughness, replaceable in case of damage, etc.

20. Precision Plating. Standard Pressed Steel Co., Box 606, Jenkintown, Pa., has made available a 32-page booklet describing its plating facilities and discussing the history and some of the technical aspects of plating. It repeatedly stresses the importance of having products exactly undersize before plating in order to have them within tolerances after plating.

21. "How to Double Your Warehouse Capacity." Catalog No. 700 issued by the Frick-Gallagher Mfg. Co., Dept. BB, Wellston, Ohio, points out that while

there can be no fixed formula for greater warehouse economy, sizeable savings of space and time are nearly always possible through better use of existing facilities and, where advisable, special storage equipment.

22. "Mable Gets the Facts about Balas Collets and Feed Fingers." Although written and illustrated in a semi-jocular manner, this booklet covers major problems encountered in the collet and feed finger business. It contains time and money saving tips, elimination of waste, etc. Available from the Balas Collet Mfg. Co., Dept. MB, 1557 E. 27th St., Cleveland 14, Ohio.

23. Sling Chains. Herc-Alloy data book No. 100 contains 32 pages of diagrams, charts and tables on standard and special styles of sling chains and attachments. Everything from "how to order" to their "care, use and inspection" is presented. Available from the Columbus McKinnon Chain Corp., Dept. MBB, Tonawanda, N.Y.

24. Hydraulic Multipress. Catalog 120-C, issued by the Denison Engineering Co., Dept. BB, Columbus 16, Ohio, shows how many manufacturing problems can be solved, and actual photographs of the Multipress in action. Also contains material on hydraulic pumps, controls, fluid motors and valves.

25. "How to Use and Care for Milling Cutters" presents, in pictures and non-technical language, the various factors that contribute to good milling practice, and suggests means and methods of setting up, operating and maintaining milling cutters. Available from the Milling Cutter Div., Metal Cutting Tool Institute, 405 Lexington Ave., New York 17, N.Y. Price \$1.00

26. Low Pressure Cylinders. Catalog 101, issued by the Nopak Div., Galland-Henning Mfg. Co., 2754 S. 31st St., Milwaukee 46, Wis., is devoted to low

## THIS HELPFUL LITERATURE NOW AVAILABLE

pressure cylinders, 650 psi maximum. Other catalogs, covering their complete line of air or hydraulic cylinders and valves, will follow.

**27. Built Up Snap Gage.** Leaflet available from Mechanical Products Co., Dept. BB, 30 Manhan St., Waterbury, Conn., describes different methods of assembly and many uses of a new convertible built up snap gage, which company claims will eliminate gage labor costs other than finish spacer block, grind two opposite surfaces on both anvils, and grind tolerance step.

**28. Cam Follower Bearings.** New 4-page bulletin issued by McGill Mfg. Co., Inc., Dept. MB, Valparaiso, Indiana, describes design and performance features of Camrol cam follower roller bearings, and several manufacturing techniques.

**29. Cemented Carbide Blanks.** Catalog No. 1, covering their complete line of "Firlomet" cemented carbide blanks, is available from Firth-Loach Metals, Inc., Dept. MTB, Buttermilk Hollow Rd., McKeesport, Pa. Includes all styles of standard and modified-standard blanks, rectangular strip, pulley grooving and stone chisel blanks, underground inserts, etc., as well as a description of the plant.

**30. Tapping Machines.** The Hamilton Tool Co., 826 S. Ninth St., Hamilton, Ohio, has made available Bulletin No. 5203 describing their super-sensitive small hole tapping machine.

**31. Grinding and Abrasive Cut-Off Machines.** Two new bulletins, one covering the Bridgeport line of Grinding Machinery and the other the Bridgeport line of "Abrasive" abrasive cut-off machines, are available from Lobdell United Co., Dept. BB, Wilmington 99, Delaware.

**32. Solid Adjustable Taps.** Bulletin No. G-92-2, recently revised by Landis Machine Co., Dept. MTB, 22 Church St., Waynesboro, Pa., includes detailed data on all Landis solid adjustable taps which cover a tapping range from 1-1/16" to 9". Information is also given on the special LSA tap which taps and chamfers in one operation.

**33. Lathe Turret.** The Westwood 4 position automatic indexing tool post turret for engine lathes is described in a bulletin issued by the Westwood Engineering Co., Dept. BB, 2234 Purdue Ave., Los Angeles 64, Calif. Turret is available for 12", 14" and 16" machines.

**34 "Selection of Carboloy Grades and Suggested Speeds"** points out the importance of selecting the proper grade of cemented carbide for use in a tool for a particular cutting job. It discusses the various grades, their characteristics, specific uses and suggestions for their application. This supplement, section 3A, is available from Carboloy Dept., General Electric Co., 11129 E. 8 Mile Drive, Detroit 32, Mich.

**35. Hydraulic Transmission.** Vickers, Inc., Dept. MB, 1400 Oakman Blvd., Detroit 32, Mich., has available Bulletin No. 47-40B, outlining operational advantages and design features of the Series TR3 ¾ hp variable speed hydraulic transmission for industrial application.

**36. Gears, Sprockets.** A new 200-page catalog giving specifications and prices of over 8,000 stock items, including gears, sprockets, chains, splines, etc. is available from Universal Gear Works, Dept. MTB, 1301 E. McNichols, Detroit 3, Mich. Also featured is the 1600 series drilling units, dust collectors, etc.

## SENT FREE UPON RETURN OF POSTAL CARD

**37. "Automatic Gaging and Size Control."** Typical examples of high speed gaging with an Air-Electric CompAIRator are given in this new 4-page folder available from the Taft-Peirce Mfg. Co., 32 Mechanic Ave., Woonsocket, R.I. A description of an Air-Electric sorting machine is also included.

**38. Carbide Tools.** An attractive catalog, No. 554, issued by the Atrax Co., Dept. MB, 240 Day St., Newington 11, Conn., gives a complete detailed description of their entire line of precision ground carbide grinding tools, routers, boring tools, countersinks, burs, drills, reamers, and end mills.

**39. Balanced Action Gages.** Winter Brothers Co., Dept. BB, Rochester, Mich. has issued a complete catalog on their new line of plug and ring gages. Both thread gages and plain cylindrical gages are available in the styles that conform to American Gage Design Standards.

**40. Gear Hobbers and Cutters.** Newark

automatic gear hobbers, for the production of helical and herringbone gears, worm wheels and spur gears, are described in a bulletin issued by Potter & Johnston Co., Dept. MB, Newport Ave., Pawtucket, R.I. Also available is a bulletin covering Newark automatic spur gear cutters.

**41. Steel Stock List.** A new stock list issued by the Advertising Dept. BB, U. S. Steel Supply Div., U. S. Steel Corp., 208 S. La Salle St., Chicago 90, Ill., is divided into four sections, each with a separate, easy-to-open cover. The sections cover special metals, industrial supplies, prices-references, and carbon steels.

**42. "The Adventures of Countersunk J. Lathe."** A humorous and well-illustrated story revolving around a character who lives in the very ordinary town of "Inertia Under the Elms." He invents something called a "widget" which he hopes will improve the standard of living in his town. The story goes

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WHEATON, ILLINOIS

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## MACHINE and TOOL BLUE BOOK

READERS' SERVICE DIVISION

WHEATON, ILLINOIS



on from the first "widget" made by hand to where the entire community is busy and prosperous. The author then points out a parallel to this story in several of our American industries. Available from Enterprise Publications, Dept. MB, 11 N. Wacker Dr., Chicago 6, Ill. Price 15 cents.

43. **Stainless Steel Wall Chart**, published by Alloy Metal Wire Div., Dept. MTB, H. K. Porter Co., Inc., Prospect Park, Pa., presents complete engineering properties of stainless steel wire, rod and strip. Printed on heavy, durable paper, the chart measures 17"x22".

44. **Hydro-Air Power Unit**. A 16-page bulletin, No. 61763, issued by the Pantex Mfg. Corp., P. O. Box 660, Pawtucket, R. I., gives the first complete application, specification, price, and operating data on their new Hydro-Air power unit.

45. **Template and Cam Machine**. A new booklet available from Pratt & Whitney,

Dept. BB, West Hartford 1, Conn., gives complete information on the New England Model 104 electronic template and cam machine. Operating directly from multiple-size drawings, the Model 104 produces a wide variety of templates, edge cams, and blanking punches and dies of irregular shape.

46. **Soft Blank Top Jaws**. Bulletin SJ-67 and price list issued by the Skinner Chuck Co., Dept. MTB, 207 Edgewood Ave., New Britain, Conn., give full information on their complete line of soft blank top jaws. Folder also illustrates and describes their new line of long pointed jaws for inside gripping and small diameter work.

47. **Compression Fixture and Setting Gage** for recessing tools is described in a bulletin issued by Scully-Jones & Co., 1907 S. Rockwell St., Chicago, Ill. Details are also given of company's micrometer grinding fixture for circular form tools used in automatic screw machines and recessing tools.

## **Tear Off and Mail This Postage-Paid Postal Card**

### **MACHINE and TOOL BLUE BOOK**

**MARCH, 1955**

Please send the following literature which I have encircled below:

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35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51
52																

NAME..... POSITION.....

COMPANY.....

STREET.....

CITY..... ZONE..... STATE.....

**48. Metalworking Clamps.** A new bulletin issued by Wetzler Clamp Co., Dept. BB, 43-15 11th St., Long Island City 1, N. Y., contains descriptions, specifications and illustrations of their complete line of clamps. A new double action welders' clamp "Swing-Tite" designed for hard-to-get-at clamping surfaces, is featured in this folder.

**49. Service Stations.** The Lima Electric Motor Co., 119 Findlay Rd., Lima, Ohio,

has issued a new service brochure which lists the names and addresses of authorized Lima service stations, representatives and factory distributors all over the country.

**50. Motor Arbors.** Leaflet available from S. A. Woods Machine Co., Motor Div., 27 Damrell St., Boston 27, Mass., covers their complete line of motor arbors. Features: 3/4", centerline to flattened top or either side, up to 5 hp; taper

## Cut Production Costs By Feeding Parts with **SYNTRON**



"Vertical  
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**Parts  
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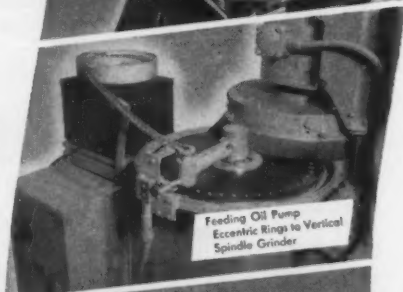
Provide automatic, oriented position feeding of parts at finger-tip controllable rates. Handle parts of practically any shape or material. Speed production—eliminate handling damage.

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mounted saw-flange insures accuracy of face and is readily demountable for bearing inspection, etc.

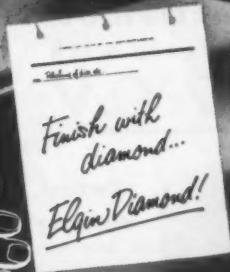
**51. Hydraulic Lift Trucks.** Catalog M54, issued by the Big Joe Mfg. Co., Dept. BB, 900 W. Jackson Blvd., Chicago 7, Ill., covers their complete line of battery operated and manually operated hydraulic lifts, for loading, unloading, stacking, or moving almost anything weighing up to 1000 lbs. The "Drum-

toter" truck attachment for handling drums, is also included in this catalog.

**52. Work Holding Devices.** Lassy Tool Co., 108 Bohemia St., Plainville, Conn., has issued an illustrated circular complete with specifications and prices on their multipurpose work holders. Made in 4 standard models, capacity from  $\frac{1}{8}$ " to 4", hardened and accurate to .0005. Folder also shows a few of the setups the Model P-2 and standard accessories will make.

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can cut your finishing  
costs how to use  
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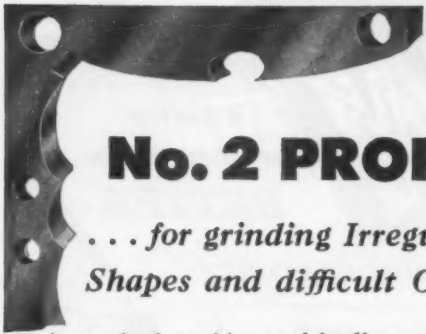
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# Boyar-Schultz

## No. 2 PROFILE GRINDER

*... for grinding Irregular  
Shapes and difficult Contours*

A standard machine tool in die shops and in tool rooms where grinding odd shapes and difficult, irregular contours is necessary.

It is a particularly useful machine for grinding and fitting large dies and punches such as forming dies for refrigerators, table tops, sanitary ware and in automotive and aircraft shops.

Spindles in dual spindle model illustrated, turn at 10,000 RPM; stock removal is rapid even with small diameter wheels. Uses wheels  $\frac{1}{4}$ " to 3" in diameter.

### No. 1 Profile Grinder

A bench model with spindle speed of 20,000 RPM. Performs in minutes, many jobs that would ordinarily require hours. Uses wheels  $\frac{1}{8}$ " to 1" diameter.



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MACHINE TOOLS

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product made  
**BETTER**

**WITH THESE ADDED NEW FEATURES:**

**1** ADJUSTABLE TAKE-UP TO ELIMINATE END-PLAY  
IN FEED SCREW ASSEMBLY. BACK-LASH CAN BE  
TAKEN UP INSTANTLY

**2** AND — TALK ABOUT LARGE OFFSET! OUR SMALL-  
EST MODEL HAS  $\frac{3}{4}$  IN. OFFSET AND OUR LARGEST  
MODEL HAS  $4\frac{1}{2}$  IN. OFFSET.



**ALL in**



**Toolhead**

BORING  
FACING  
TURNING  
GROOVING  
UNDER-  
CUTTING

MODEL  
4½

MODEL  
3½

MODEL  
2½

MODEL  
1½

MODEL  
¾

MODEL  
¾



**A Model For Any  
Size Machine**



**PLUS-**

**POWER  
FEED for  
FACING  
and  
GROOVING**

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**A Boring Head  
That Won't Face  
is NOT Complete**

# Chandler-Duplex

**COMBINED BORING AND FACING TOOLHEADS**

**in MILL HEADS**

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**Builds the BEST Quality  
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### **1/4 H.P. CONVERTICAL MILL HEAD**

Only low cost mill head with quill travel attachment.

High speed medium-light operation.

For bench, floor and pedestal mills.

Fits milling machines with overarm 1 1/2" to 3".  
3/8" end mill capacity.

**\$245.00**



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### **1/2 H. P. MILL HEAD**

HEAVY DUTY MILLING ATTACHMENT

Fits milling machines with 3" to 5" overarm.

3/4" end mill capacity.

For vertical, horizontal and angular operations.

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HEAVY DUTY MILLING ATTACHMENT

Fits milling machines with 3" to 5" overarm.

3/4" end mill capacity.

For vertical, horizontal and angular operations.

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**RUSNOK TOOL WORKS**

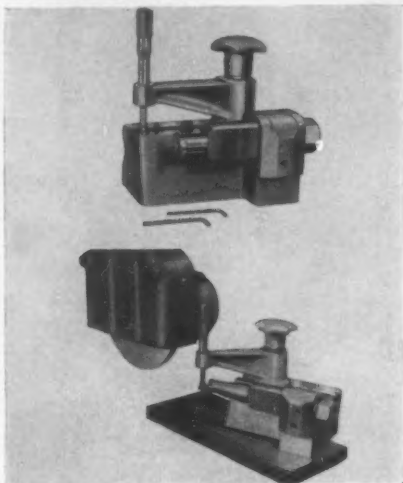
4840 West North Ave., Chicago 39, Ill.

DEALERS IN ALL PRINCIPAL CITIES

**MILLING • DRILLING • BORING**



Continued from page 261



ing to the table) on universal type grinders.

Features claimed are: fast, easy setup for grinding and measuring face offset; close control over tool diameters and angles; consistent reproduction of flat cutting faces, parallel to center line and square with the sides. After sharpening, the cutter may be set in the machine or recessing tool and used without further checking by cut-and-dry methods.

Top face of fixture is used for adjusting micrometer to zero or center line of cutter, top picture. Micrometer arm swings to any position for gaging and may be removed to prevent interference when grinding, bottom picture.

Use ACTION Card, opposite page 64. Encircle No. 12

### New production flexibility in punch presses

New production flexibility has been added to the Walsh line of open back, inclinable punch presses through their recently introduced Hi-Flex system,



*MIGHTY GOOD AT ANY PRICE . .*

*but TOPS AT \$69*

### A NEW DURANT SCRAP CHOPPER

A low cost scrap chopper operated by the press ram, independent of the die & without power. A tool steel blade gives a longer cutting life. These Durant units are easily bolted to press, handle any stock up to 3" wide & .062" thick, from any position. Whatever your needs may be there is a Durant chopper of proper size, capacity power and price. Our free catalog gives complete information on a wide range of press room equipment.

**DURANT** TOOL SUPPLY CO.

136 So. Water St. Providence 3, R. I.

# HOW MAJOR INDUSTRIES NOW CUT Product Costs

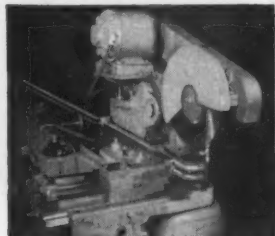


- 2** HOLLOW TRACTOR BOOMS—Cold bending 12 ga. welded steel tapered tubes without distortion on Size 4 Pines unit eliminates expensive blanking and forming dies, saves tons of material for farm equipment manufacture.

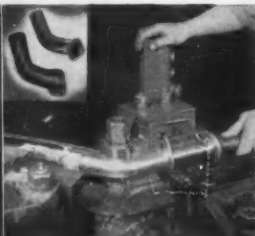


- 3** EXTRUDED WINDOW FRAMES—Part of production line setup in large aluminum fabricating plant, this small Pines Semi-Automatic saves space, accurately bends automobile window frame moldings.

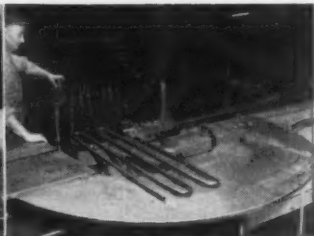
- 4** REFRIGERATION AIR CONDITIONING ELLS—Special Pines Automatic Cut-Off Benders now produce copper ells and return bends at speeds up to 1500 per hour, reduce scrap losses to 1%.



- 5** ENGINE MANIFOLD TUBES—Short 1 1/2" O. D. steel tube now bent to 1 1/2" c/f radius with flange attached saves space, insures accuracy, cuts costs.



- 6** BOILER TUBE AND REFRIGERATION COILS—Typical setup bending continuous serpentine coils from 1/2" steel tubing. Reduces welding, fabricating costs. Other installations range from 1/4" copper up to 3" steel tube.



- 1** AIRCRAFT TUBING—Smooth, extra sharp bends now produced in ultra-thin stainless steel tubing, saves space and \$74,000 per plane for aircraft manufacturer. Shown above, Pines Size 4 Unit forming wrinkle-free 8" c/f radius bend in 4" x .090" S. S. tubing.

## with PINES PRODUCTION BENDERS

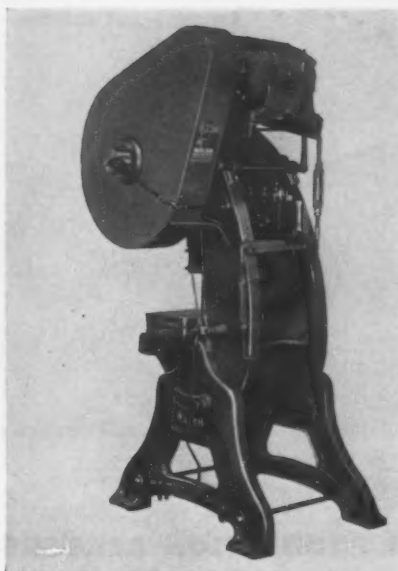
The examples shown here are a few of the countless number of production jobs that are now handled efficiently and more profitably on Pines Automatic Benders. They illustrate the versatility and the many cost-cutting advantages of cold forming round, square, rectangular, extruded, or hollow stock the "Pines-Way". Simplicity of tooling, uniform accuracy, and ease of operation are proven features of Pines machines which today help hundreds of plants cut product costs. At Pines you'll find an unmatched wealth of bending experience and creative tooling skill readily available to help you develop better methods and save time on production problems.

Write for  
Free data sheets

To keep abreast with latest developments in bending, write for copies of "Pines News"—bi-monthly mailing piece that gives facts on new, cost-cutting bending applications.



**PINES** ENGINEERING CO., INC.  
Specialists in Tube Fabricating Machinery 492 WALNUT • AURORA, ILLINOIS



which includes a variable speed drive, high speed, mechanical on-off brake, and automatic lubrication system.

Presses may be operated at an extended range of speeds: 24 ton, from 70 to 210 strokes per minute, 12 ton, 160 to 480 strokes per minute. Speed changes may be made while the press is in operation.

Brake will stop the press at the completion of a cycle even at the highest speeds. The system is available on presses from 6 to 65 tons, and may be installed on Walsh presses now operating. Walsh Press and Die Co., Division American Gage and Machine Co., Dept. BB, 4709 W. Kinzie St., Chicago 44.

Use ACTION Card, opposite page 64. Encircle No. 13

#### **Air chuck for internal and external holding**

Wright Airchuck Model 5000 for internal and external holding, was designed for high speed production on lathes of 10"-12" swing. Parts are pre-

## *Commander* **TAPPER**

- Wider Range . . . 1 Tapper Handles No. 0 to 3/4" Taps
- Automatic Tap Protection
- Furnished to fit ANY Drill Press

Commander—"The Tapper That Thinks For Its Operator," has the adjustable full range torque control that instantly stops any tap when it becomes dull, loaded, strikes a hard spot or bottoms in blind hole tapping. Assures maximum tap protection, higher production, even with inexperienced operators.

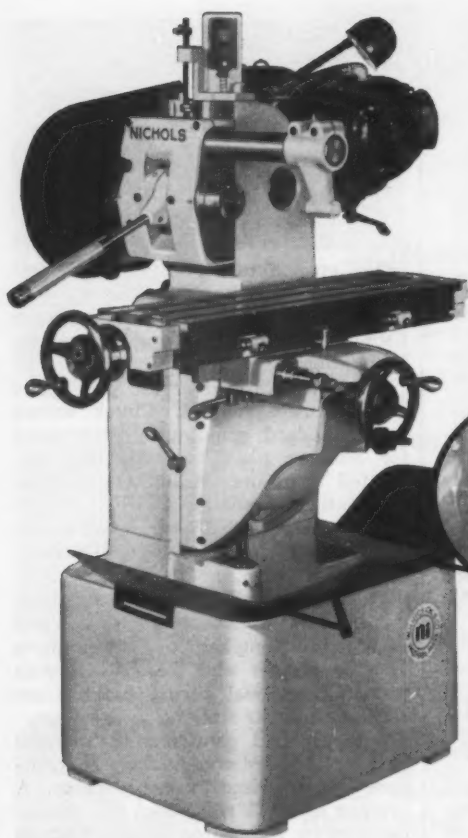
Your nearby Commander Distributor can give you a demonstration in your own plant. Write for his name and a copy of the NEW Commander Full Line.

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4227 W. KINZIE STREET CHICAGO 24, ILL.  
Product of Commander . . . Builder of Production Tools



Any operator  
does precision  
tapping with  
a *Commander*  
**TAPPER**

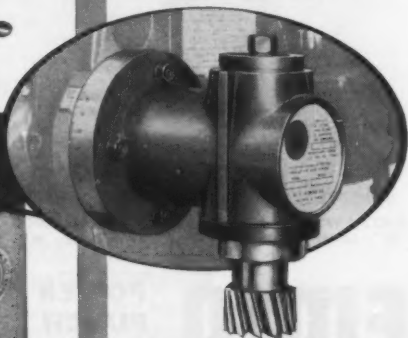
Product of *Commander* . . . Builder of the *Multi-Drill*



The unusual versatility and extra capacity of this model make it extremely useful for the tool room. Because it is equipped with the "rise-and-fall" spindle, it can perform not only conventional precision milling, but also facing boring, key seating, contour milling and other operations. Both longitudinal and transverse feed screws are fitted with hand wheels and extra-large adjustable micrometer dials with easy-to-read graduations. This model is especially useful because of its compactness, generous capacity and ability to handle a wide variety of work to close tolerances — to "tenths" when desired!

## THE *Nichols* TOOL ROOM MILLER

*"the miller that uses its head!"*



A valuable accessory is the Nichols Heavy-Duty Vertical Milling Attachment. Takes full 1½ H. P. up to 2000 R. P. M. (So precise, some shops use it for jig boring!)

### CONDENSED SPECIFICATIONS

Table Working Surface	8½" x 30"
Longitudinal Travel	19"
Transverse Travel	7"
Vertical Travel—Knee	13½"
Rise and Fall of Spindle	4½"
Selective Speed Ranges up to 3000 R. P. M.	1250 lbs.
Weight	

Write today for Nichols general catalog which describes the six models of Nichols Millers. A sound, color movie, "the Miller that Uses its Head" is available for free showing. May we reserve it for you?

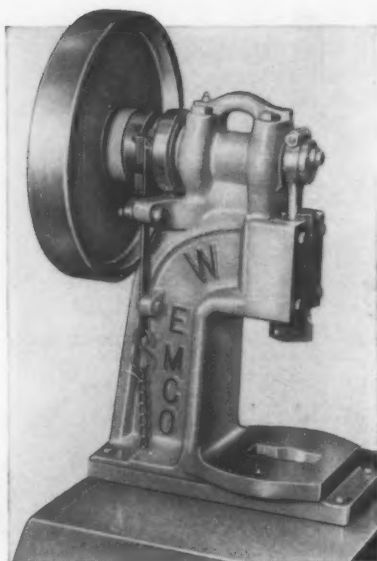


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WHITE PLAINS, N. Y.



EMCO "W", bench type, 5-ton; also larger EMCO "X", 10-ton. Both sizes also stand-mounted. With or without motor drive.

## EMCO POWER PUNCH PRESSES

are **SPEEDY** and **SAFE**

Versatile EMCO presses excel for punching, forming, stenciling and riveting metal, leather plastics and other non-metallic materials. Up to 300 operations per minute. "Big machine" speed, strength, rigidity, accuracy, endurance. Compact, fool-proof, simple design — easy to operate. Thousands of EMCOS in money-making use testify to Klaas' dependability since 1921.

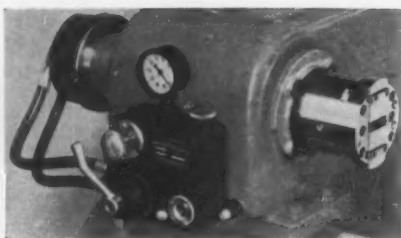
Ask for our Bulletin "B-3"

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TO  
INDUSTRY

**THE KLAAS MACHINE  
& MFG. CO.**

4346 East 49th St.  
Cleveland 25, Ohio

**KLAAS-BUILT**



cision ground to high standards. Unit holds concentricity tolerances to .0005". Internal porting from external grease fittings is claimed to assure proper lubrication of every moving part.

A 30 to 1 ratio over the psi of line pressure is developed. Chuck screws onto standard spindles, without need for adapter plates, eliminating unwanted overhang. Bulkiness has been eliminated, providing a small, lightweight chuck with low flywheel action and high starting, stopping and reversing speeds.

The power cylinder has a precision lapped low friction, high speed seal designed for long life. All internal parts of the cylinder and rotary seal with exception of seal thrust bearing are lubricated by air stream.

Compact and complete, the control unit is comprised of moisture trap, pressure regulator and four-way valve. A product of the Wright Tool Co., manufactured by Associated Screw Products Corp., Dept. MTB, 223 S. Hindry Ave., Inglewood, Calif.

Use ACTION Card, opposite page 64. Encircle No. 14

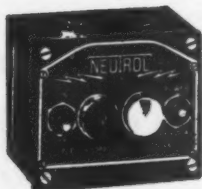
### End mills have uniform flutes

An automatic machining process produces New Design end mills to accurate physical dimensions, uniform flutes in each. Each flute is cut in only one direction.

End mills are claimed to cut freely and accurately in ferrous and non-ferrous metals with increased strength and durability. Wadell Tools, P.O. Box 97-BB, Raritan, N.J.

Use ACTION Card, opposite page 64. Encircle No. 15

# *Electrical* CONTROLS FOR INDUSTRY



## **ELECTRO-MAGNETIC CHUCK CONTROL**

Releases and demagnetizes work pieces simultaneously. No time lost. No damage to work or chuck face. Protects chuck from voltage surges. Speeds production. 50 to 15,000 Watts . . . 60 to 20,000 Sq. In. Chuck area.



## **ELECTRO-MATIC RECTIFIER**

Engineered for dependable power conversion in constant year after year service. Quiet and efficient. For all industrial applications. 50 Watts to 40 Kilowatts.

## **NEUTROL CHUCK CONTROL and HOLDING POWER REGULATOR**

Combines the advantages of NEU-T-ROL with the benefits of absolute voltage regulation. Control of holding power is infinitely variable through entire dial range. Best holding power predetermined for an operation is automatically repeated. Assures true parallel grinding. Manual or motorized control models.

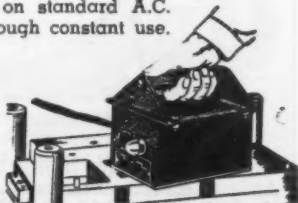


## **ELECTRO-MATIC A.C. DEMAGNETIZER**

Demagnetizes dies, punches, cutters, tools that have been magnetized from any source. Works by simple contact. Operates on standard A.C. voltage. Will not overheat through constant use. A size for every purpose.

### **All Models Fully Warranted**

*Special Models Engineered to Meet Every Need  
Your Inquiries Will Be Promptly Answered  
Without Obligation*



## **ELECTRO-MATIC PRODUCTS CO.**

2235-37 N. KNOX AVE., CHICAGO 39, ILLINOIS, U. S. A.

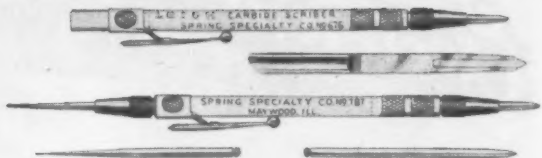


## Light-Weight carbide scriber

Of the size and shape of a lead pencil, the Leigh carbide scriber has a round polished solid aluminum body,  $\frac{1}{4}$ " dia.,  $4\frac{1}{2}$ " long, knurled for positive grip. It is used for marking hardened steel, laboratory ware, ceramics, plastics, glass, etc.

A steel screw collet and nose piece,  $\frac{1}{8}$ " capacity, is pressed into the aluminum handle for quick length adjustment and reversing of points. Collets fit either the No. 676-D carbide point or the No. 787-D steel point.

Carbide point assembly has  $\frac{3}{64}$ " dia. solid carbide rod, approximately  $\frac{1}{2}$ " long, set in steel tube  $2\frac{1}{2}$ " long,  $\frac{1}{8}$ " dia. Copper is brazed into steel for carbide



rigidity and protection.

The steel point is hardened and centerless ground,  $2\frac{1}{4}$ " long,  $\frac{1}{8}$ " dia.

No. 676 scriber has a single carbide point. No. 787 scriber is a double-pointed tool, and comes with one carbide point and one steel point. Both scribers are equipped with a spring pocket clip. Spring Specialty Co., 23 N. 5th Ave., Maywood, Illinois.

Use ACTION Card, opposite page 64. Encircle No. 16

## Chuck is accurate to .0002" t.i.r.

The Horton Tru-Set chuck claims accuracy of .0002" t.i.r.

The micro-screw adjustment of the

chuck back enables the operator to align the workpiece practically within the limits of the accuracy of the lathe. Chuck is available with either three

**Get a better "SURFACE GRINDER" job at less cost**

**New \*\*Chatter Resistant, Spring Loaded Spindle**

Let us put this spindle in your old radius dresser - - \$5.00

**RADIUS DRESSER \$39.00**

DIAMOND \$7.00

**ANGLE DRESSER \$44.00**

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**ORDER DIRECT**  
on our 10 day  
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guarantee



Hardened shaft—bearing adjustable for wear.  
Diamond always perfectly centered.  
Easily set adjustable 180° steps.

10" Wheel size for DeAll and NORTON  
Grinders—\$44.00. Diamond \$7.00.

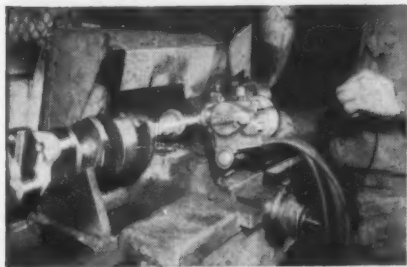
SPECIAL 20" Wheel Size \$110.00.

Ball Thrust Bearing. 24  
Precision Ground Surfaces. Can be set  
very accurately with a Protractor or  
Sine Bar. Works underneath the wheel.  
Large Bearing surfaces.

**The "Mighty Midget" Line**

SPERMAN METAL SPECIALTIES • 2197 E. 21st ST. • BROOKLYN 29, N. Y

# when mistakes happen...



Automotive crankshaft being brought up to inspection standards with metallizing. This automotive manufacturer formerly used plating for this type of salvage, worked one per hour. With metallizing, the salvage operation requires only 5 to 10 minutes per shaft, including surface preparation.



## Free Bulletin

Get the full story on metallizing in production salvage. Bulletin 57-C describes and illustrates the procedures, provides data on typical parts, with interesting photo-micrographs showing the unique bonding action of Sprabond Wire. Send for a copy.



## Metallizing Engineering Co., Inc.

1147 Prospect Ave., Westbury, L. I., New York • cable: METCO  
in Great Britain:  
METALLIZING EQUIPMENT COMPANY, LTD.—Chesham near Watlington, England

...and they do in any busy machine shop, there's no need to scrap a mis-machined or otherwise damaged machine part that represents an investment of many expensive man-hours.

Parts like these are brought up to inspection standards quickly, easily and inexpensively with metallizing.

And with the new molybdenum metallizing wire, Sprabond, the only surface preparation required is cleaning. The molybdenum forms a molecular bond with the surface being rebuilt. Little heat is generated, eliminating any danger of warpage.

What's more—users have found that the extreme hardness of the molybdenum coating, and its microscopic porosity which provides superior lubricating characteristics, improve its "wear-ability" over ordinary bearing surfaces as much as 25 times. **You haven't just salvaged a part—you've improved it.**

The trade name, SPRABOND WIRE, is the property of Metallizing Engineering Co., Inc.

DOH A. WATSON  
METALLIZING ENGINEERING CO., INC.  
1147 Prospect Ave., Westbury, Long Island, N. Y.

- ☐ Please send me Bulletin 57-C.  
☐ Please have Metco Field Engineer call.

Name

Company

Street

City  Zone  State



## BURGMAS<sup>T</sup> TURRET DRILLS

with POWER INDEXING

"Without the BURGMAS<sup>T</sup> our costs to produce this part would have been almost prohibitive."

### REPORT FROM: AMPEX CORPORATION

REDWOOD CITY, CALIF.

ROLF J. GRUENSTEIN, Sup't. of Fabrication

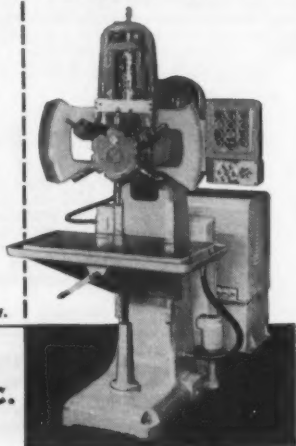
In the fabrication of Ampex CinemaScope Sound Systems used in theaters all over the world, one casting requires 42 separate drilling, tapping, reaming or counterboring operations. This includes drilling holes from #57 (.043 inches) to 3/4 of an inch, and reaming holes to 1/2 inch with extremely critical dimensions on size and alignment. Without the BURGMAS<sup>T</sup> our costs to produce this part would have been almost prohibitive. Other equipment to fill the same need would have been much more expensive and much less versatile for our type production.

We have found the following qualities of the BURGMAS<sup>T</sup> to be of definite advantage in the manufacture of Ampex CinemaScope Sound Systems and Ampex Magnetic Tape Recorders. High Precision. Wide range of preselected speeds. Large adjustable work table. Low maintenance cost. Minimum time and effort required for set-up.

Visit our Booth 516, March 14-18, ASTE Western Exposition, Los Angeles, for preview of unique new metal working tools.

BURGMAS<sup>T</sup> cut costs on drilling, tapping, threading, counterboring, counter-sinking, grooving, spot facing, form tooling, hollow milling, etc.

Available in 6 spindle manual; 6 and 8 spindle, hydraulic, automatic models. All BURGMAS<sup>T</sup> feature power indexing, pre-selective spindle speeds, very close pre-selective depth control.



Write for Bulletin No. BB-3

\*T.M. Reg. U.S. Pat. Off.



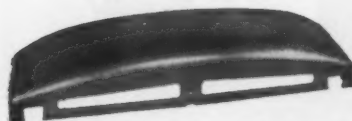
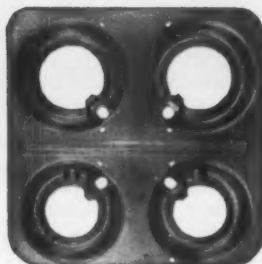
**BURG TOOL**  
MANUFACTURING COMPANY INC.

P.O. BOX 48, GARDENA, CALIF.



# Plastic Low Cost Tooling

## For Dies... Drill, Welding, and Assembly Jigs



*Vulcan, keeping pace with modern tooling, can recommend plastic tooling for medium production on numerous tool programs.*

Plastic tools are light in weight, have good impact, compressive strength and dimensional stability. No hand finishing of parts required as galling or marking is eliminated by using plastic form dies.

Contours and odd shapes are cast or laminated to suit individual tools, saving expensive machine and hand finishing operations.

Plastic tools, built in a matter of days instead of weeks, lower your tool costs for those medium production runs.

Our actual production figures prove plastic has a definite place in modern production.

Vulcan Tool Company's organization, building fine tools since 1916, believes new tooling developments must be proved by tool engineers. Since plastic is not a cure-all your problem should be handled by recognized, practical tool men.

Our engineering staff will recommend the correct plastic material and advise if parts of your tooling program should be in plastic.

*Send a part print and your production requirements for quotation and recommendations.*

**Major Vulcan Services** . . . Engineering, Processing, Designing and Building . . . Special Tools . . . Dies . . . Special Machines . . . Vulcamatic Transfer Machines . . . Automation . . . including the Vulcan Hydraulics that Form, Pierce, Assemble and size. Vulcanaire Jig Grinders . . . Motorized Rotary Tables . . . Plastic Tooling.

## VULCAN TOOL CO....PLASTIC TOOL DIVISION

727 HIGHLAND AVENUE

DAYTON, OHIO



**PRECISION  
BORING**

**WITH**

**MAXWELL  
MASTUR  
TOOLS**

● Adjustable to 0.0002-inch, the new improved MASTUR boring tools feature precision, speed and long service life. New body and block construction permits these tools to take heavier cuts at higher speeds — to do more work in less time.

Adjusting-screw head is graduated into 50 divisions to provide readings in thousandths, and body is graduated to permit vernier readings of 0.0002-inch. The three models available have maximum boring bar capacities of 1/2, 3/4 and 1-inch and boring range from 3/8 to 15 inches.

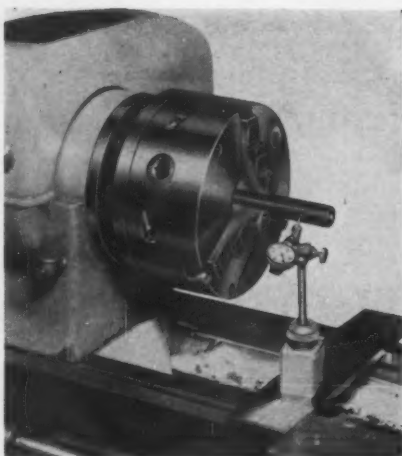
985-MCT



Write for  
catalog.

**THE MAXWELL  
COMPANY**

220 Broadway • Bedford, Ohio



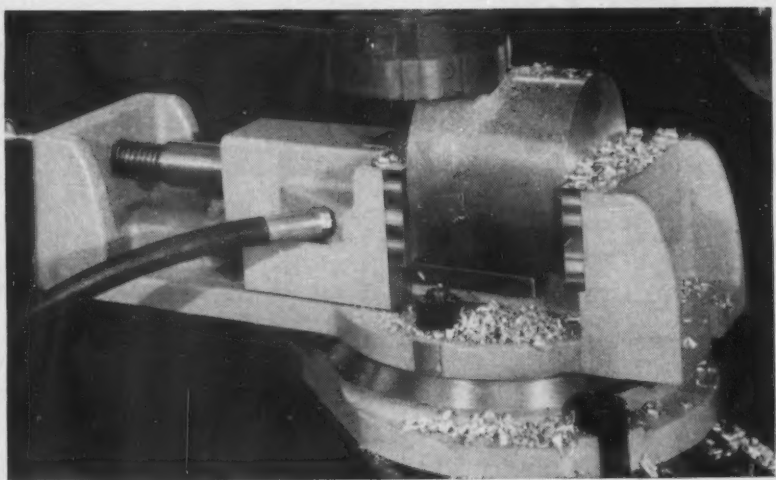
or six jaws. Each has three operating pinions for opening and closing the jaws. Available in sizes of 4"-12" dia. Horton Chuck, Dept. MTB, 12 Canal Bank, Windsor Locks, Conn.

Use ACTION Card, opposite page 64. Encircle No. 17

### **Bench milling machine**

Bench milling machine, Model No. 333, has ball bearing headstock, vertical head slide, cam-operated. Screw-feed vertical adjustment, table slide, cam-operated, cross slide with screw-feed, cutter arbor, cylindrical overarm sup-





## Bites Like A Bear 800 Times An Hour

The MilOmatic "MM" Power Vise cuts loading time 80% and has a locking force of 9000 lbs. at normal air line pressure. This fast, strong, air powered hydraulic clamping means more production, less labor per piece on milling, drilling, grinding, shaping, broaching, and other machine applications. "MM" eliminates expensive tooling when specially shaped jaws are installed.

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**WILTON** TOOL MFG. CO., INC.

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WILTON TOOL CANADA LTD. GUELPH, ONTARIO, CANADA



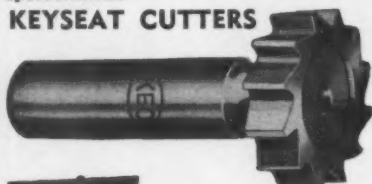
# KEO

## CENTER DRILLS

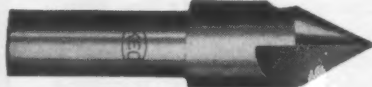


Made of finest high speed steel. Available in all standard sizes. Always in stock for immediate delivery. Specials made to your specifications.

## KEYSEAT CUTTERS



High speed. Right hand  $\frac{1}{2}$ " shank. Diameter from  $\frac{1}{4}$ " to  $1\frac{1}{2}$ ". Standard sizes in stock for immediate delivery. Complete set—41 sizes—available in sturdy, hardwood box. Saves time and money, because you always have the size you need.



## CENTER REAMERS

High speed steel. Reamers from  $\frac{1}{4}$ " to 1" regularly furnished with 60°, 82°, 90° included angle. Specials made for your specifications.

## LATHE MANDRELS



Precision made of tool steel, hardened and accurately ground. Tapered .0005" to the inch. Mandrels from  $\frac{8}{16}$ " to 1" are .0005" undersize at small end, from  $1\frac{1}{2}$ " to 3", .001" undersize. Immediate delivery.

### Write for Literature

Illustrated literature and prices on all KEO Products mailed on request.

## KEO CUTTERS

19326 Woodward - Detroit 3 Mich.

port are other features. Oil pan and coolant pump are optional equipment.

These machines were designed primarily for time fuze work and for use by instrument and electronic manufacturers. All castings are made of meehanite. Stark Tool Co., Dept. BB, P.O. Box 22, Maynard, Mass.

Use ACTION Card, opposite page 64. Encircle No. 18

## Carbide drill has new construction features

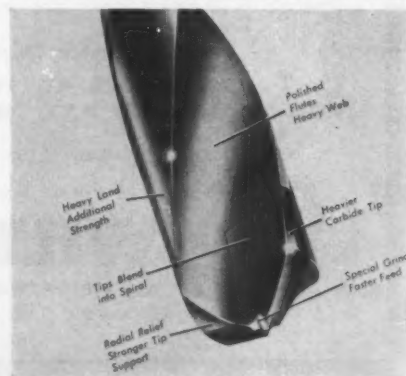
A new carbide tipped twist drill boasts several novel construction features.

The spiral on the face of the tip is blended into that of the drill for better chip clearance and less strain; also the end of the drill is radially relieved to provide more steel behind the tip and maximum support.

The unit has an extra heavy carbide tip, extra heavy web for strength, and a heavy land to preserve its diameter and serve as a pilot. Body of the drill is high speed steel. Flutes are polished. A notch ground in the tip contributes to faster feeds, more cuts per sharpening.

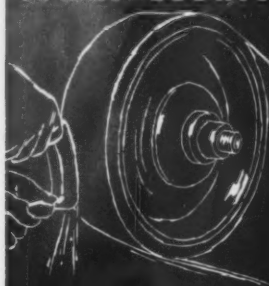
Feeds as high as 8" per minute in cast iron are claimed. Drill is stocked in fractional, wire and letter sizes. Super Tool Co., Dept. BB, 21650 Hoover Rd., Detroit 13, Mich.

Use ACTION Card, opposite page 64. Encircle No. 19



# NEW

## SPRAY LUBRICATION



## FOR ABRASIVE BELTS



**Economical . . . clean . . . easy to apply—**  
Stuart's New Excelene Grinding and Polishing Oils improve surface finish and increase belt life production as much as 50 to 100% on many abrasive belt grinding and polishing operations. Two types of Excelene, FD for ferrous metals, and NF for non-ferrous metals, are available from your abrasive belt distributor in easy-to-use 12 oz. pressurized cans.

It's easy to spray production on your abrasive belts with Excelene. Here's an example.

An aluminum cooking utensils manufacturer was getting 75 pieces per belt with grease stick lubrication—and using four gallons of solvent per operator each day to clean the belts. Excelene NF Polishing Oil not only kept the belt clean but increased belt life to 135 pieces each.

Call your abrasive belt distributor today—or fill out the coupon at right.

More than a "Coolant" is Needed

**D. A. Stuart Oil Co.**  
EST. 1865 LIMITED

For further information on  
**STUART'S EXCELENE**

Clip to your company letterhead and mail to:

D. A. Stuart Oil Co., Ltd.,  
2749 S. Troy St., Chicago 23, Ill.

Name

Title

Name of your Belt Distributor



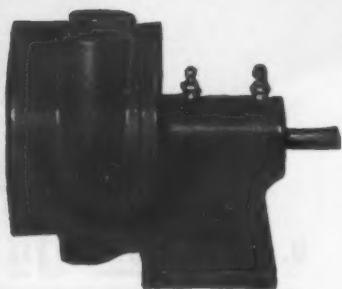
## CENTRIFUGAL COOLANT PUMPS

Precision-designed and engineered  
to do **ONE THING** and **DO IT BEST:**

**KEEP TOOLS COOL AND  
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AND LAST LONGER**

For the machine tool and other industries, FULFLO  
COOLANT PUMPS play an inestimable part in

**PROLONGING TOOL  
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EQUIPMENT COSTS**



MODEL NOR Right rotation  
MODEL NOL, Left rotation  
Direct connection;  
1600 to 2000 gallon;  
8 gals. per min. at 1725 rpm

Direct, motor or belt driven.  
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from  $\frac{3}{8}$ " to  $1\frac{1}{2}$ ".

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state if for Pumps, for  
Valves or for both.



**THE FULFLO SPECIALTIES CO. Inc.**  
PUMP AND VALVE MANUFACTURERS  
BLANCHESTER, OHIO

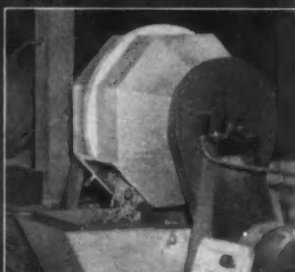
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... lower finishing costs

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**F**used crystalline  
aluminum oxide . . .

in lumps, nuggets, chips,  
grit or grain. Borolon tumbling  
abrasive cuts fast and is the ideal mass  
media for deburring, removing flash and bead,  
putting a radius on small parts . . . and giving a  
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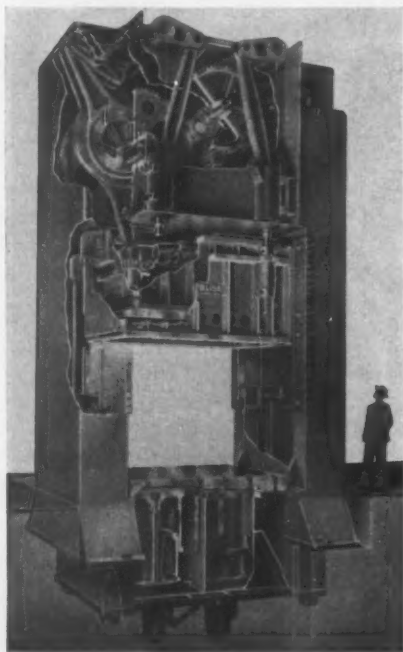
Division of Simonds Saw and Steel Co., Fitchburg, Mass. Other Simonds Companies: Simonds Steel Mills, Lockport, N.Y. Simonds Canada Saw Co. Ltd., Montreal, Que. and Simonds Canada Abrasive Co., Ltd., Arvida, Que.

## Packaged Presses Have Built-in Wiring, Piping and Controls

Six lines of "packaged" single and multi-action presses, for forming and drawing large stampings for automotive and appliance industries, conform to Joint Industry Conference bolster, bed, die and slide area specifications and to blankholder and plunger dimensions. In this way, an auto factory can make several sets of dies and ship them to distant plants knowing that dies will fit. Standard bed and slide dimensions make it possible to transfer dies from one press line to another during model changeovers.

All controls, wiring, piping, power

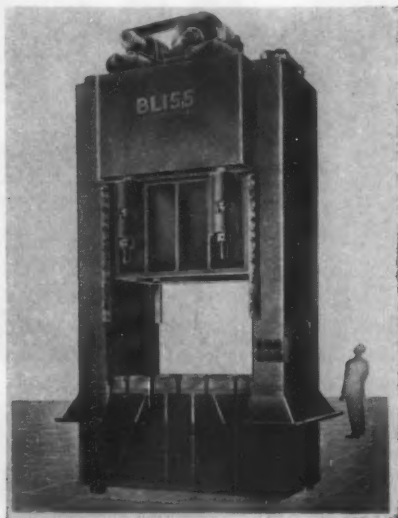
D-2, a double-action, straight-side, eccentric, two-point press, has air counter-balance cylinders built into uprights. Four-piece shrunk tie rod construction. Speeds up to 10 strokes per minute.



and air line takeoffs are built into the uprights. The uncluttered exterior makes it easier to equip them with automatic feeding and unloading machinery. Cranes come right up to them without snagging overhead pipes or wires or bumping into built-up crowns. Installation is simplified because wiring, electric controls and pipes are already positioned; only in-plant connection need be made. Two lines feature the underdrive design, with its lower overall height, made to conform to modern building design in which headroom for cranes is at a premium.

Of the six new lines, three are single-

D-4, four-point, double-action press has enclosed wires, pipes, controls, lubrication and counter-balance cylinders. Barrel-type plunger adjustment permits use of dies varying in height; manual blankholder adjustment compensates for uneven blank-holding distribution. Speeds up to 10 strokes per minute.

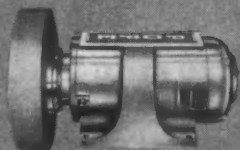


**WANT TO  
GRIND IN**

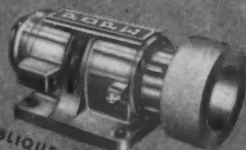
**MILLIONTHS?**



OBLIQUE-WHEEL UP



HORIZONTAL



OBLIQUE-WHEEL DOWN

*Specify*  
**POPE**

**2500 SERIES  
HEAVY DUTY  
MOTORIZED  
SPINDLES**

*For*  
**Surface Grinders,  
Planers, Boring  
Mills and other  
Machine Tools**



Diamond Wheel  
VERTICAL-WHEEL UP



Diamond Wheel  
VERTICAL-WHEEL DOWN

**for MORE PRODUCTION**

**BETTER SURFACE FINISHES**

**TOLERANCES IN THE MILLIONTHS**

use these P-2500 Series Spindles.  
They have the extra power,  
bearing capacity and rigidity to  
do the job.

Write for new Catalog No. 58A

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TRADE MARK REG. U.S. PAT. OFF.

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ESTABLISHED 1930

261 RIVER STREET • HAVERHILL, MASSACHUSETTS  
**BUILDERS OF PRECISION SPINDLES**



# PAYS FOR ITSELF!



**by sharpening just one gross of hack saw blades**

You can resharpen a gross of hack saw blades at least 6 times—actually saving you the price of this machine.

**WARDWELL Model EC Combination Grinder** is the only single unit grinder adaptable for hack, band and circular saws that does not depend on the shape of the grinding wheel to form the shape of the tooth. This unique feature enables operator to grind a variety of blades without dressing or changing wheels.

*Write for Bulletin EC Today.*



**WARDWELL Manufacturing Co.**  
3807 Ridge Road, CLEVELAND 9, OHIO

**Maker of largest line of saw and tool sharpening machines**

*Multiple Position Lathe Carriage*

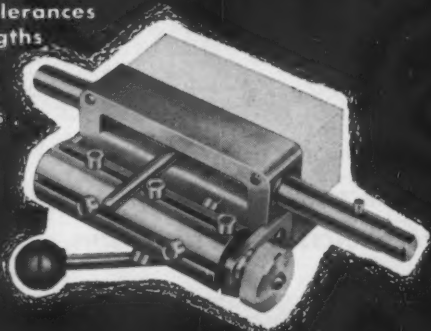
**PRECISION-STOP\***

*... up to 15 possible positions*

- Maintains critical tolerances on longitudinal lengths
- Set up to required positions in seconds
- 3 inch stop bar travel

*Dealer and Distributor  
Inquiries Invited*

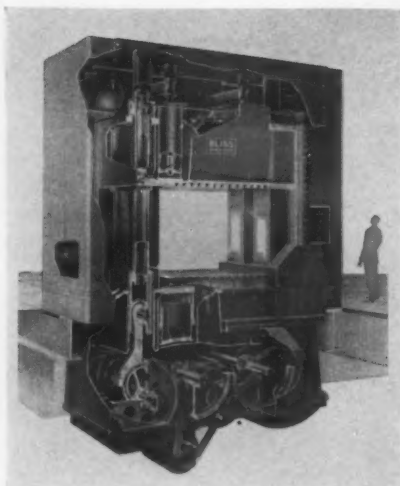
\*Pat. Pend.



**EDWARD JENTSCH, Inc.**

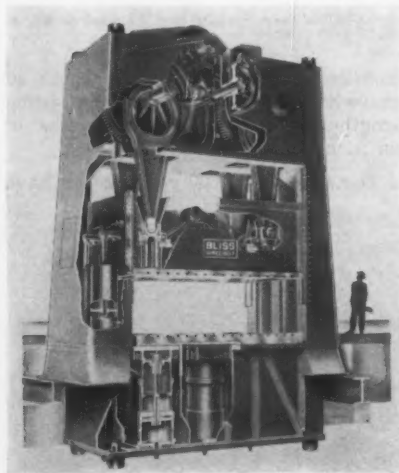
11 Penobscot St.

Clifton, N. J.



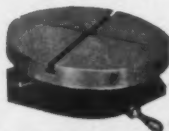
SU-4, four-point, single-action, underdrive model, has drive mechanism beneath the press and counterbalances in slide instead of crown.

S-4, four-point, 2000-ton single-action press for work with deep front-to-back dimensions. Four main gears, with eccentric gears on one side of each main gear.



# TROYKE ROTARY TABLES

- Saves fixtures and time consuming setups.
- Saves time in circular positioning.



## CAM LOCKING TYPE ROTARY TABLES

Three sizes: 12", 15", 18".

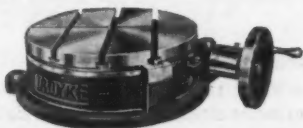
This model is intended for die sinking, bench work, and assembly of machine units when quick rotation and positioning are required.



## STANDARD MODELS WORM WHEEL OPERATED ROTARY TABLES

Five sizes: 9", 12", 15", 21".

For die sinking, jig boring, cam milling. Indispensable in wood and metal pattern shops.



## HEAVY DUTY MODELS WORM WHEEL OPERATED ROTARY TABLES

Three sizes: 18", 21", 25".

These larger, heavy duty models are used for jig work, planer jobs, and on horizontal boring mills.

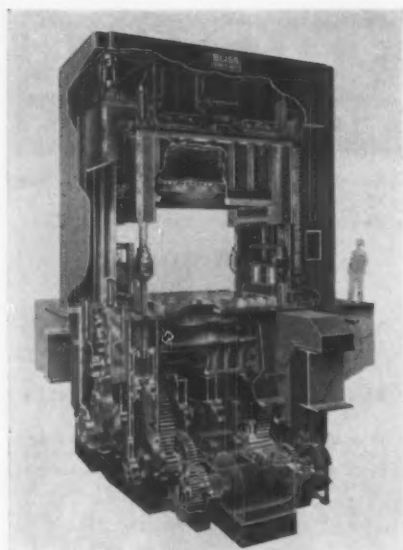
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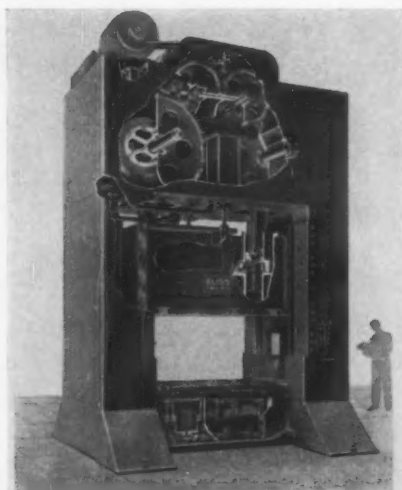
**TROYKE MFG. CO.**

CINCINNATI 9, OHIO



TU-4 is a four-point, triple-action, underdrive press. Clutch has been eliminated; drive is direct, through an electric motor with interlocked air brake.

action (SE-2, S-4, and SU-4), two are double-action (D-2 and D-4) and one, the TU-4, is a triple-action underdrive press. All feature heavier, thicker



The 2E-2 250-ton, straight side, single action, full eccentric press is double geared. Speed is approximately 25 strokes per minute. Sizes from 200 to 2000 tons.

frames, automatic recirculating oil systems, manual and motorized plunger and blankholder adjustments, high-speed air or electric clutches and front-to-back shafts.

Use ACTION Card, opposite page 64. Encls. No. 20

### Compression spring grinder

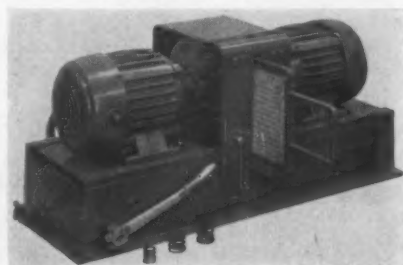
The No. 1 bench mounted double end disc grinder simultaneously grinds both ends of compression springs. It is used for both small and large production runs.

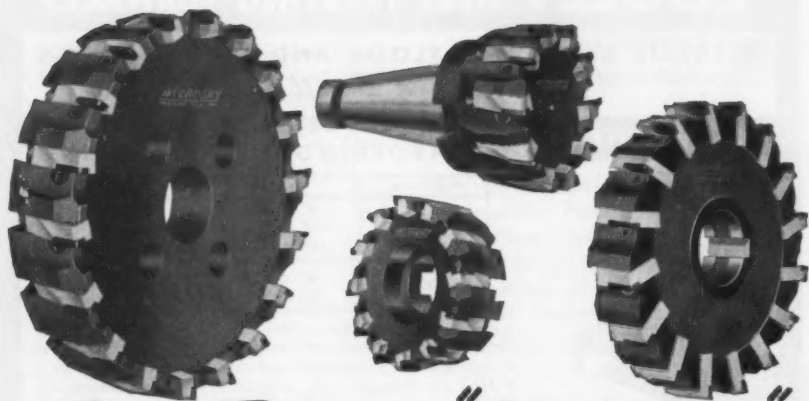
Speed of grinding varies with size and quantity of springs inserted in frame. One hundred small springs  $\frac{3}{8}$ " od, 1" long made from  $\frac{1}{32}$ " music wire can be ground in two to three minutes.

Recommended capacity: wire diameters .010" to .0625"; outside diameters  $\frac{1}{8}$ " to  $1\frac{1}{2}$ "; lengths from  $\frac{1}{8}$ " to  $4\frac{1}{2}$ ". Squareness of grinding is usually within 2°. An adjustable stop at left end

can be set to control the travel of the wheels thereby holding the spring lengths within a few thousandths of an inch, it is claimed.

The two 1 hp 1800 rpm motors have





## Shop Proved "Jack Lock"®

Face, Shell, Shank, Half-Side and Staggered Tooth

# MILLING CUTTERS

High Speed, Alloy or Carbide Tipped Blades

*Help You Make Bigger Profits*

• Engineered to meet modern milling practices—McCrosky Jack-Lock Milling Cutters combine the rigidity of solid tools with the greater economy — longer life — the easy, positive locking of each blade, without hammering — and the quick release and accurate blade adjustment of McCrosky shop-proven nationally recognized Jack-Lock Wedge.

Department superintendents, foremen and operators have found that there's nothing better or cheaper, than McCrosky Milling Cutters. You can't keep competitive with less. Why gamble? *Write for Bulletin 17-M today.*



# McCrosky

**TOOL  
CORPORATION**  
MEADVILLE, PA.

Engineering and Sales Representatives in the Principal Cities

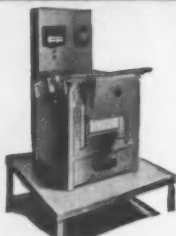
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**ELECTRIC BOX TYPE • FLOOR AND BENCH MODELS**

*For Tools and Small Parts*

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**THE COOLEY BENCH MODEL  
for HARDENING AND TEMPERING**



Max. Temp.	Sizes	Price
1850°	8" x 6" x 14"	\$255 to \$655
	10" x 6" x 18"	
	10" x 8" x 18"	
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	10" x 6" x 18"	

All prices are less controls. Any standard controls available for automatic temperature control.

- Available with hinged or vertical lift door.
- Heating elements fully protected from mechanical or atmospheric destruction.

**Controlling Pyrometers carried in stock — available for all applications.**

Free on request: ☐ COMPLETE CATALOG ☐ "SHOP NOTES ON HEAT TREATING"

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**ELECTRIC MANUFACTURING CORP.**  
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**Over 600 sizes carried in stock for  
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FORM TOOLS give you uniform, correct dimensions, better finish and appearance, less set-up trouble. In short—maximum production at the lowest cost.

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**SOMMA TOOL COMPANY Inc.**

**Manufacturers of Standard and Special Precision Form Tools**

**21 BROWN STREET • WATERBURY, CONN.**

special thrust bearings and individual starters. Two standard 10" dia., 1" thick, aluminum oxide abrasive discs, with no hole in center and having no perforations, are supplied. The grinding wheels can be run in opposite directions and slowly brought together to dress each other. A wheel dresser is also provided. The Carlson Co., Dept. BB, 277 Broadway, New York 7, N.Y.

Use ACTION Card, opposite page 64. Encircle No. 21

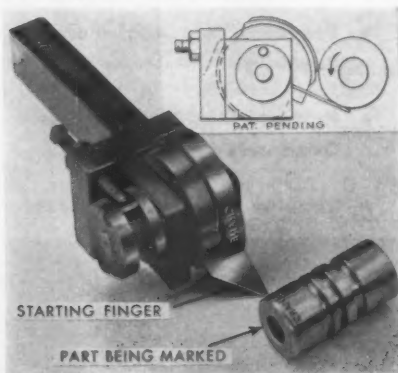
### Starting finger for roller die marking

To eliminate difficulties encountered in marking names, numbers, trademarks, etc., on round metal surfaces, Quality Die Co., Dept. B, 9300 S. Baltimore Ave., Chicago 17, has introduced the Hoffman starting finger for use with roller dies to enable oscillation of the stamp mechanism automatically as the work is being advanced to contact with the die.

This finger starts the movement of the die as the lathe brings the work toward it. By meeting the die and work simultaneously, defacing of piece parts is claimed to be eliminated.

When the marking operation is completed and the lathe pulls the tool holder away, a tripper clicks and the die is returned to its original position.

Use ACTION Card, opposite page 64. Encircle No. 22



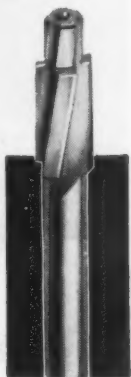
## SUPERBORE COUNTERBORES

**in Standard sizes and Oversizes  
— above standard dimensions**

- Finest High Speed Steel
- Smooth, Fast, Free-Cutting Operation
- No Clogging or Freezing of Chips
- Heat Treated

- Fore and Aft precision grinding of flutes and pilot allow chips to flow out freely. SPECIAL Pilot and Flute diameter's ground from blanks in three to four days.

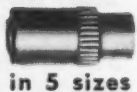
- SUPERBORE counterbores in stock for immediate delivery.



**write for BULLETIN No. 20**

## GARBERDING STOP PINS

- STOP-PINS are complete self contained units that hold securely in stripper plate. All sizes have 1/32" wall permitting insertion close to die or punch. NO THREADS inside STOPS for springs to catch on.



**in 5 sizes**



**write for BULLETIN No. 25**

in emergency phone: LIBERTYVILLE 2-4200

### TWENTIETH CENTURY MANUFACTURING CO.

ROUTE 176 and BRADLEY ROAD  
BOX 429-B LIBERTYVILLE, ILL.





## Now—Lock Your Feed Rates to Protect Machines . . . Reduce Costs with the **CROSS** Flow Control Lock!

Only authorized personnel carry a key for the Cross Flow Control Lock! They set machine feed rate, then lock it.

Easy to install. Just remove valve nameplate and adjusting lever, re-install over lock mounting plate.

Available for Vickers  $\frac{1}{4}$ " flow control valves and remote control panels.

For full details, write Dept. A-51.

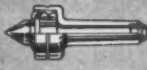
- Eliminates Tampering
- Stops Costly Shutdowns
- Prevents Tool Abuse and Breakage
- Protects Machines Against Overloads
- Reduces Maintenance Costs

Established 1898

THE **CROSS** CO.  
DETROIT 7, MICHIGAN



Shank



Ball & Roller



Pipe Type



Bull Nose



Built-in Spindle



High Speed



Carbide Tipped



Reversible  
Grinder Dogs



Cam Action  
Grinder Dogs

Anti-Friction • High Speed  
• Carbide Tipped -200  
Models, speeds up to 4000  
RPM, capacities to 200 tons.

# RED **E** CENTERS

## WORLD'S MOST ACCURATE PRECISION CENTERS



# NOW!

## DISTRIBUTOR STOCKED

At long last—RED-E CENTERS, with the *ACCURACY GUARANTEE* are made available to you through your distributor. Now you have a choice of sizes, types, shanks, tapers, heads and bearing assemblies for your every turning and grinding operation.

Satisfy your special need—conveniently, completely; obtain super finish, ultra precision unmatched accuracy—at no extra cost!

REPLACE WITH RED **E** and be Sure

**YOUR DISTRIBUTOR IS READY TO SERVE YOU!**

Call on him today! Literature available, of course, no obligation.

DISTRIBUTOR INQUIRIES INVITED!

CENTER Specialists Since 1908

RED **E** TOOLS

## READY TOOL COMPANY

550B Iranistan Ave.

• Bridgeport 5, Conn.

VISIT RED-E—ASTE, L. A., BOOTH 1025

# Gun Parts

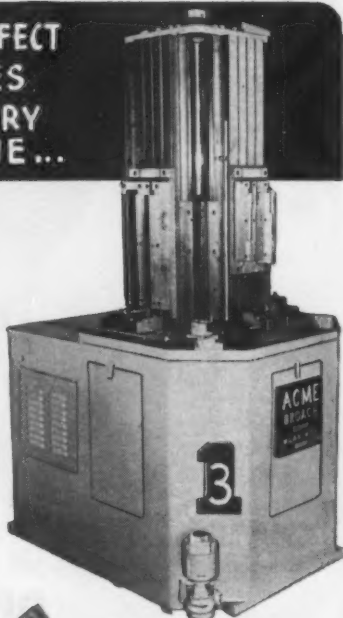
PERFECT  
ONES  
EVERY  
TIME...

HIGH PRODUCTION  
using the

## ACME MODEL U-31 VERTICAL BROACHING MACHINE

Acme Broach Corporation recently supplied a prominent manufacturer this machine, as pictured, completely tooled for the production of various automatic shotgun parts. . . . The entire outline of some parts is finished by broaching, while only vital forms and surfaces are finished on others. Production is high and six broaching operations are performed simultaneously, as this machine has three broach slides and fixture stations.

Acme manufactures all types of broaching machines, broaching tools and accessories as well as hydraulic presses, gun rifling machines and special hydraulic machines. . . . Let us submit recommendations on your broaching requirements. Write today.



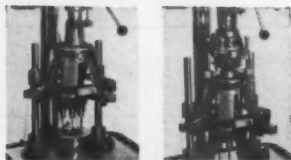
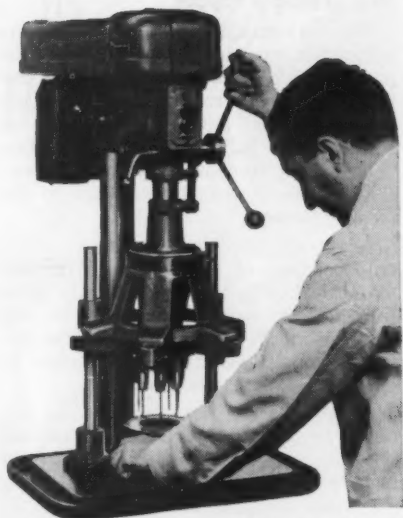
# ACME BROACH CORP.

MILAN, MICHIGAN

**Taps or drills  
over a million  
different  
hole combinations**

**The NEW**

## **ETTCO-EMRICK Flex-Shaft Adjustable Spindle Multiple Head**



**IT DRILLS — IT TAPS.** Takes only a moment to convert. 1:1 drive ratio ideal for lead screw tapping.



**FLEXIBLE SHAFT SPINDLES** are positioned quickly, accurately even while unit is running.



**FLEXIBLE SHAFTS** run in either direction without unravelling, whip or vibration — can be removed in seconds.

**TAPPING ATTACHMENTS • MULTIPLE HEADS • TAPPING MACHINES • INDEXING FIXTURES • TAP AND DRILL CHUCKS**

- Exclusive flexible shaft drive spindle design makes it the most versatile, most easily adjusted head ever. It's just what the doctor ordered for **stepping up production and slashing costs** on an unlimited variety of small parts tapping and drilling. It's virtually a complete production line — all in one compact, lightweight, low-cost unit.
- Ingenious flex-shaft spindle design with quick adjustment feature on each spindle gives wider range of settings — cuts set-up time way down.
- The only head of its kind that taps or drills on any drill press without use of reversing motor.
- For horizontal or vertical tapping or drilling.
- Needs no special engineering — you put it to work on your jobs at once.
- Capacities up to 5/16".
- Unconditionally guaranteed to do the job for which it's sold — you can't lose!

Call your Etcco-Emrick Distributor for details — or write us direct.

For details in print write for Bulletin 600



**ETTCO TOOL CO., INC.**

**596 Johnson Ave., Brooklyn 37, N. Y.**

Chicago • Detroit • Menlo Park, Calif. • Worcester  
Distributors throughout the U.S. and Canada

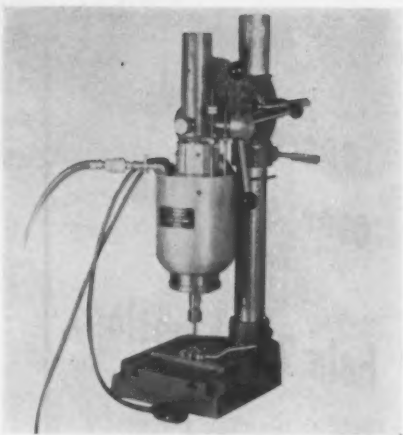


### New-principle tapper

An automatic tapping unit incorporates an air motor with electro-pneumatic control which provides for momentary tap reversals at rates up to 200 cycles per minute. The tap chuck itself is driven through triple spiral spring mechanism which is super-sensitive in detecting resistance to the cutting force.

Any such resistance—whether due to chip loading or to the nature of the material being tapped—instantly puts into effect whatever rate of tap reverse-and return is required for the work, never permitting application of excessive, tap-breaking force.

Cutting torque is controlled to the ounce by the unit, which accommodates taps in a size range of from No. 2 x 56 to 5/16". It produces Class 3 threads in materials ranging in hardness up to Rockwell 50 C. The only limiting factor is the hardness of the tap itself.



Hole depth can be preset to within  $\pm .0035$ ", and the unit works equally well in blind holes or through holes. Smith & Wiese Co., Dept. BB, 1265 W. 2nd St., Cleveland 13, O.

Use ACTION Card, opposite page 64. Encircle No. 48

## 16" & 22" **WOTAN** HIGH SPEED PRECISION SHAPERS

**FOR TOOLROOM & PRODUCTION WORK  
CONVENIENT TO USE**

Equipped with V-Ram  
Automatic Pressure Lubrication  
(Incl. Ram Ways)  
Cutting Speed Indicator  
V-Belt Motor Drive

22" SHAPER: 8 Speeds - 12-132 Strokes per Min.  
16" SHAPER: 6 Speeds - 26-152 Strokes per Min.

### SPECIAL EQUIPMENT AVAILABLE

Tilting Clamping Plate—Universal Table—  
Power Down-Feed to Toolhead—Automatic  
Tool Lifter.

For Full Details Write, Wire or Phone:



**IMMEDIATE  
DELIVERY**



## **PARKER MACHINE COMPANY, INC.**

158 PIONEER STREET • BROOKLYN 31, N. Y. • TEL. TRIangle 5-2103 & 2157

### Gage measures internal diameters of small holes

New Standard Division, U. S. Expansion Bolt Co., Dept. B, York, Pa., has introduced a direct-reading hole gage which measures the internal diameters of small holes ranging from .020" to .130", and which is claimed accurate



to within .0005" over the entire range.

The instrument is called "Kwik-Chek" and is similar in appearance and operation to a ball-point pen or automatic pencil. In operation, only one hand is required.

The scale is graduated in thousandths of an inch.

Use ACTION Card, opposite page 64, Encircle No. 23

### Pedestal type lathes

Sheldon Machine Co., Inc., 4258 N. Knox Ave., Chicago 41, has announced a new pedestal design for its 1955 lathes.

The cast iron pedestal fully encloses the motor and drive. The tailstock leg provides a large storage space for tools and accessories. Pedestal is available



MASTER TOOL MAKERS SAY  
they save up to 50% with  
the REGENT

## DUPLICATOR TABLE

in the production of

- Plastic, Rubber and Glass Molds
- Forging and Die Cast Dies
- Punches, Contoured Parts

### MOUNTS ON ANY BRIDGEPORT MILLING MACHINE

- DUPLICATE any shape  
2 or 3 dimensional with ease
- Capacity 6" x 6"  
ratio 1 to 1 with master
- Single lever table control  
for ease of operation
- Table floats on precision balls
- Mounts on mill in matter of minutes

Write for descriptive literature

J. M. KALINS & COMPANY  
115 East Washington Ave., Bridgeport 8, Conn.



**NEW** *Mall*  
**"SQUATTY"**  
 Pneumatic Impact Wrench  
**MAKES QUICK  
 WORK OF TOUGH  
 NUTS**



Tough, frozen, and stripped nuts yell, "UNCLE" when "Squatty" goes to work. It's designed to handle hard-to-get-at jobs... loosens the toughest nuts and bolts. Its flat back enables operator to place his chest or shoulder behind the wrench. Capacity  $\frac{3}{4}$ ",  $8\frac{1}{4}$ " high, spindle offset  $2\frac{1}{8}$ ".



The MALL MAN in your area will give you an on-the-job demonstration of "Squatty"... no obligation. Phone or write the MALL Service Warehouse nearest you.

**MALL TOOL CO.**

PORTABLE POWER TOOLS  
 Gasoline—Electric—Air

7742 S. Chicago Ave., Chicago 19, Illinois

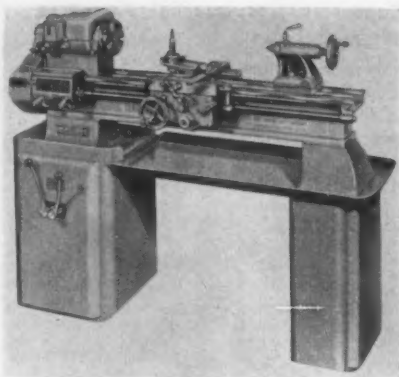
Send me all the facts about the MALL "Squatty."

Name \_\_\_\_\_

Company \_\_\_\_\_

Address \_\_\_\_\_

MU-165



on all 10", 11" and 13" swing lathes.

Other improvements include the adoption of double neoprene cog V-belts to the spindle for greater pulling power and longer life. These special belts are resistant to oil, heat and static. A new safety type switch prevents accidental turning on or off of power.

Use ACTION Card, opposite page 64. Encircle No. 24

**Automatic feed boring machine**

This precision boring machine features an automatic feed unit which gives a complete cycle consisting of:



rapid traverse, feed, dwell, and rapid return. Cycle is accomplished by means of limit switches.

Total length of feed and length of rapid traverse is adjustable by means of trip dogs. Machine may be stopped at any time during the cycle. Feeds from 1½" to 13½" per minute are available. Simplex Machine Tool Corp., Dept. BB, 4548 W. Mitchell St., Milwaukee 46, Wis.

Use ACTION Card, opposite page 64. Encircle No. 25

### Adjustable-Torque driver for lead screw tapping

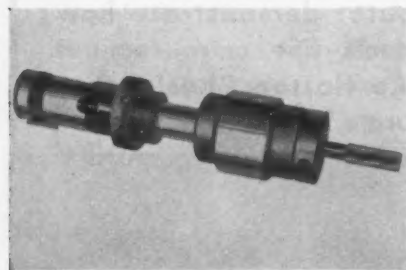
A special releasing driver with a spring-loaded shank to accommodate lead screw tapping has been announced by Scully-Jones and Company, Dept. B, 1901 S. Rockwell St., Chicago.

The adjustable-torque clutch mechanism operates on the "safe-torque" principle, a method that is claimed to assure complete release and eliminate objectionable friction, heat, wear, and impact action.

There are no slipping friction surfaces or overriding teeth in the new design. A roller drive provides free-wheeling releasing action, protects threads, and prevents changes in torque settings due to friction and heat.

The driver may be preset to release when machining torque approaches the strength limits of the tap under required operating conditions. Results to date reportedly show increases in tap life as high as 500% on some jobs.

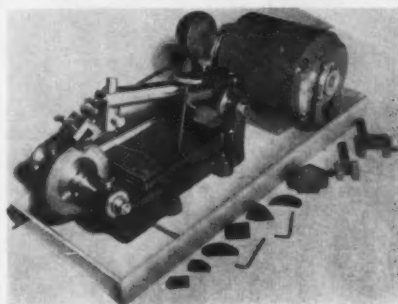
Use ACTION Card, opposite page 64. Encircle No. 26



## Carbide Users

**CAN NOW RESTORE BROKEN TOOLS AND CUTTERS QUICKLY AND INEXPENSIVELY WITH THE NEW IMPROVED MODEL NO. 300-A.**

### UNION CUT-OFF MACHINE



#### WHAT IT DOES:

- Cuts broken sections off damaged carbide tools without grinding.
- Cuts standard carbide blanks to any desired size.
- Saves time-consuming grinding on carbide tools.
- Saves carbide tools that otherwise would be scrapped.
- Saves you money on costly diamond grinding wheels.
- Saves you money by making possible the purchase of large-size standard carbide blanks.
- Simple to operate and automatic in operation.

#### SPECIFICATIONS and PRICE:

¼ H.P. Motor, 1725 R.P.M., 110 Volt.  
Overall size 10"x21"x9" high. Supplied complete with diamond cut-off blade, universal double clamp and motor for \$295.00 F.O.B. Stamford, Conn.  
Clamps for special applications extra at \$7.50 each.

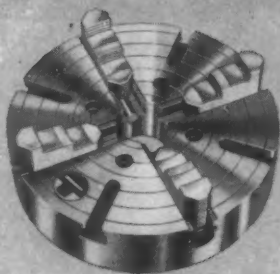
LITERATURE ON REQUEST

## UNION

### WIRE DIE CORP.

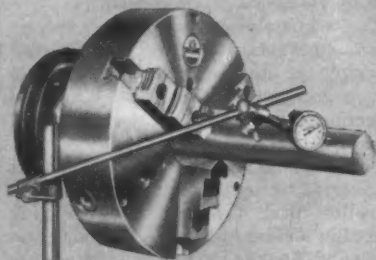
71 W. 45TH ST., NEW YORK 36, N. Y.  
PLANT: STAMFORD, CONNECTICUT

# HORTON QUALITY



## FIRST

## FOR LASTING ACCURACY



Maintained accuracy of a chuck can only be *built in*. Horton's extra built-in features cost no more, but guarantee the longer lasting accuracy of all Horton



Chucks. Let your Horton distributor demonstrate *how* Horton's five extra features make Horton Chucks stay accurate longer.

WINDSOR LOCKS, CONN.

See your Horton Distributor NOW.

# *Spot Welded* **IN 60 SECONDS!**



The Lapeer Clamp Model AO-1200

Truck cowl and plenum assemblies for a leading automotive manufacturer are placed into position, clamped, and spot welded in 60 seconds by one operator as a result of these fixtures engineered by the Martin Electric Co., Detroit.

Important to the production record of this installation is the air-operated, toggle-action clamp made by Lapeer . . . 7 on each fixture. Because they go into action so quickly, they save operator time and fatigue. Because they hold the work so rigidly, the manufacturer attains new horizons in quality control.

It's entirely possible that you have a work-holding problem that will be quickly solved by Lapeer. Better write for information—today.

Manufacturers of a complete line of Stationary and Portable Clamps and Pliers. And send for this free catalog.



**KNU-VISE  
PRODUCTS**

**LAPEER MANUFACTURING CO.**

**3052 DAVISON ROAD**

WESTERN DIVISION: 422 Magnolia, Glendale, California

•

**LAPEER, MICHIGAN**

CANADIAN DIVISION: Higginson Engr., Hamilton, Ontario

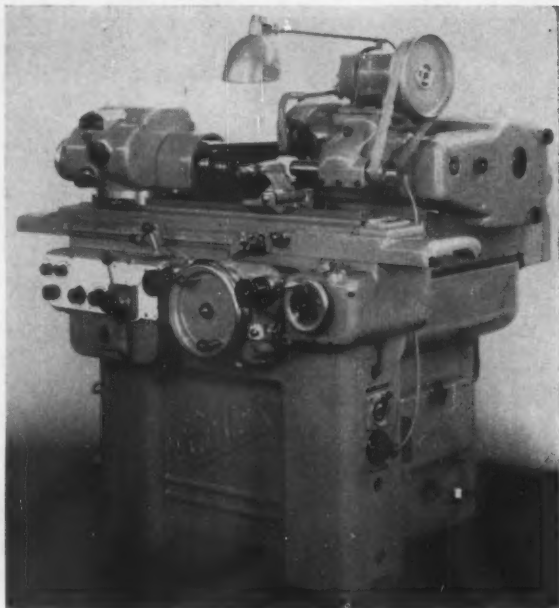
## Cylindrical grinder has rocker arm wheelhead, automatic push-button infeed of .00004".

The Carstens Resh 450 hydraulic cylindrical and form grinding machine in an ingenious way has combined something new with something already known. The infeed of the wheelhead is done for rough grinding with conventional slideways, while the fine adjustment necessary for the precision of the finished diameter is controlled by a new rocker arm method. It is possible to set an infeed of .00008" which is .000008" of the diameter of the workpiece, a noteworthy achievement for a regular stock grinding machine.

The fine infeed of the wheelhead is controlled in a geometric curve in such a way that the infeed movement starting with .0024" (can be set up to .0004") amounts to only .0001" in steadily shortened jumps. This means that just before reaching the final measurement one has the smallest infeed movement and therefore the smallest grinding pressure and as a further result a minimum of deforming of the workpiece through frictional heat or pressure. This is important for a high finished accuracy.

One or more additional infeed movements in .00004" may be set by push button: by simply pressing a button, independent of feed, the wheelhead advances exactly .00004".

The oscillation of the grinding wheel can be infinitely adjusted between 0 and 5/32". The reciprocating movement



of the workpiece table can be adjusted from the maximum grinding capacity (which is 17.75" and 30" respectively) down to 1/4".

To assure a safe sparking of the end diameters, the tarry can be set at the reversal points of the table movement from one to eight seconds. An absolutely uniform diameter of the workpiece is claimed possible through this feature. There is a switch for the infeed of the wheel for left or right of workpiece as well as for plunge-cut grinding with stationary workpiece table.

Swing capacity is 16"; 17.75" or 30" between centers. With a special accessory, holes from 5/16" to 3 5/32" can be precision ground internally. Grinding wheel wear can be compensated for by changing the end stops

# 400 Standard Cleveland Punches from $\frac{5}{32}$ " to $1\frac{1}{2}$ "



**Y**OUR orders for any of these 400 standard punches will be filled promptly from stock. Naturally they cost less than special punches. What's more, when you order Cleveland punches you're sure of getting quality tools backed by years of specialized experience. We're constantly experimenting with various steels and processes so that we can give you the very best.

Are your punching machines equipped to use standard Cleveland punches? If not, it will pay you to investigate the many advantages of standardization.

AA-696



*Diamond Anniversary*



Established 1880

## **POWER PRESSES — FABRICATING TOOLS**

City Foundry Division • Small Tool Department

E. 40th & St. Clair Avenue • Cleveland 14, Ohio

NEW YORK • CHICAGO • DETROIT • PHILADELPHIA • E. LANSING • OXFORD, O



by means of a fine adjusting screw without changing anything else on the machine. Distributor, Columbia International Corp., Dept. BB, 10-35 44th Dr., Long Island City, N.Y.

Use ACTION Card, opposite page 64. Encircle No. 27

### New flat ground die steel sizes

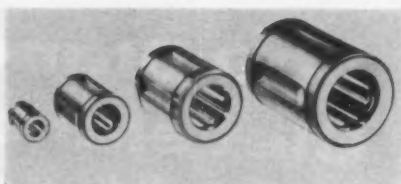
Simonds Saw and Steel Co., Dept. BB, 470 Main St., Fitchburg, Mass. has announced the addition of hundreds of new stock sizes to its line of flat ground die steel.

Sizes now range from 1/64" to 3" thick and from 1/2" to 14" wide in standard 18" lengths. The heavier sizes of oil hardening type are also furnished in 36" lengths. Air hardening type is available in standard 36" lengths only.

Use ACTION Card, opposite page 64. Encircle No. 28

### Stainless steel linear bearing

Thomson Industries, Inc., Dept. B, Manhasset, N.Y., has started produc-



tion of a series of all stainless steel "Ball Bushings," ball bearings for linear motion. They are manufactured for shaft diameters of 1/4", 1/2", 3/4", 1 1/2", 2", 2 1/2" and 3".

Bearing is able to operate in corrosive liquids or atmospheres. Low friction coefficient of .002 to .004 is claimed to afford lasting precision alignment. By selective assembly, very close and actual line-to-line fits can be obtained between the bearing and the shaft for applications where zero shake or play is a necessity. For slow and moderate speeds, this bearing eliminates the need for lubrication, exposed oil film.

Use ACTION Card, opposite page 64. Encircle No. 29

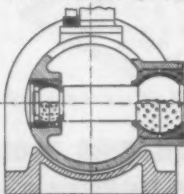
## The New LEITZ Optical Dividing Head



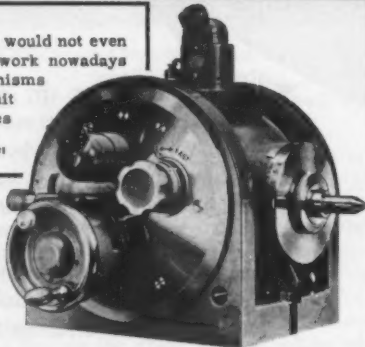
### A CUSTOMER SPEAKS:

"Without our Optical Dividing Head, we would not even attempt to make the critical indexing work nowadays necessary for things that fly, or mechanisms that must control angular motions to hit targets at a distance, to measure degrees, minutes and seconds, to eliminate angular velocity errors and vibrations in quick running mechanisms, etc."

The LEITZ Optical Dividing Head is the last word in indexing precision. Its construction is different from other optical and mechanical dividing heads on the market. A NEW DOUBLE SPHERICAL BALL BEARING, DOUBLE READING IN THE SAME EYEPIECE 180° APART, motor drive attachment and other features make the LEITZ an important aid required in any shop where precision is demanded.



◀ The 2 spherical ends of the spindle are carried in hardened steel cups with several hundred small precision balls held in place by ball cages in such a way that each ball creates its own path. There is no play, either radially or axially, no oil film, no wear and a very large load capacity.



Write for Descriptive Bulletin --- Code GIPAD

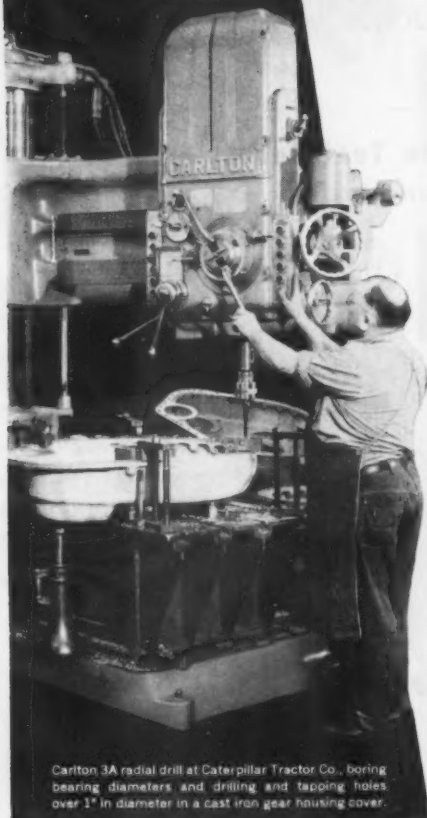
Geo. SCHERR OPTICAL TOOLS, Inc.

200-MT LAFAYETTE ST. • NEW YORK 12, N.Y.

# Caterpillar®

gets fast, accurate, heavy duty drilling with

## Carlton *radial drills*



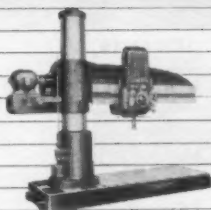
Carlton 3A radial drill at Caterpillar Tractor Co., boring bearing diameters and drilling and tapping holes over 1" in diameter in a cast iron gear housing cover.



Drilling at Caterpillar Tractor Co. is strictly large scale . . . yet it must be fast and accurate. That's why Caterpillar uses Carlton Radial Drills. Carlton has everything you need for today's hole drilling precision and production: pushbutton control, super-precision column clamp, 3-unit power clamping, low hung drive, positive tooth feed clutch and easy, economical maintenance.

You're sure to find your most economical size here, too, because the Carlton line includes arm lengths from 3-ft. to 12-ft., column diameters from 9" to 26".

Check Carlton . . . the *one* radial drill that assures you of maximum hole drilling production, precision performance today and tomorrow, and owner and operator satisfaction. Why not write today for the 'hole' story.



The Carlton Machine Tool Co., Cincinnati 25, Ohio.

**The Carlton Machine Tool Co.** Cincinnati 25, Ohio

Please send us descriptive bulletins on Carlton radial drills in sizes indicated:

Arm	Column
___ft.	___in.
___ft.	___in.
___ft.	___in.

Name \_\_\_\_\_

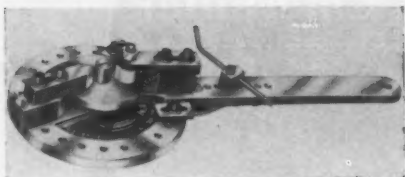
Company \_\_\_\_\_

Street \_\_\_\_\_

City \_\_\_\_\_ Zone \_\_\_\_\_ State \_\_\_\_\_

## Metal forming machine for short production runs

Lund Products Div., Artys Sales Co., Dept. BB, 11 Broadway, New York 4, N.Y., have announced a hand operated, metal forming machine—the Corvette, designed to meet the need for individual



## TIME SAVERS for the Tool Room ... and the Production Line

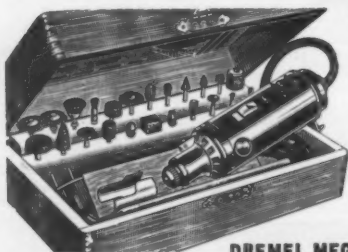
### Do It Faster With A DREMEL MOTO-TOOL

With DREMEL you can polish, grind, de-burr, sharpen without tearing down set-ups. Moto-Tool is the fastest, most powerful tool in its class. Easy to use as a pencil (dynamically balanced and weighs only 13 oz.). Put the DREMEL to work. See how it pays off in speed, convenience and time savings!

APPROXIMATELY  
27,000 R.P.M.

MOTO-TOOL NO. 2.  
with one emery wheel point  
\$17.85

MOTO-TOOL KIT NO. 2,  
with 23 accessories (high  
speed steel cutters) and Model  
2 Moto-Tool in sturdy steel  
case .....\$25.95



GRINDING



SHARPENING



DEBURRING



See Your Nearby Industrial  
Distributor or write for Catalog.

DREMEL MFG. CO., Dept. 215-C, Racine, Wis.

# 2 new frames

COLORFUL FUNCTIONAL DESIGN

The new Victor No. 10 and No. 15 frames fit either 10-inch or 12-inch blades, yet are built around a solid, one-piece steel backbone, the most rigid construction ever devised. New under-the-handle lever-lock automatically — instantly — puts correct tension on every blade. Colorful molded Tenite handles appeal to eye and hand.

## VICTOR No. 20

LIST PRICE \$3<sup>25</sup>



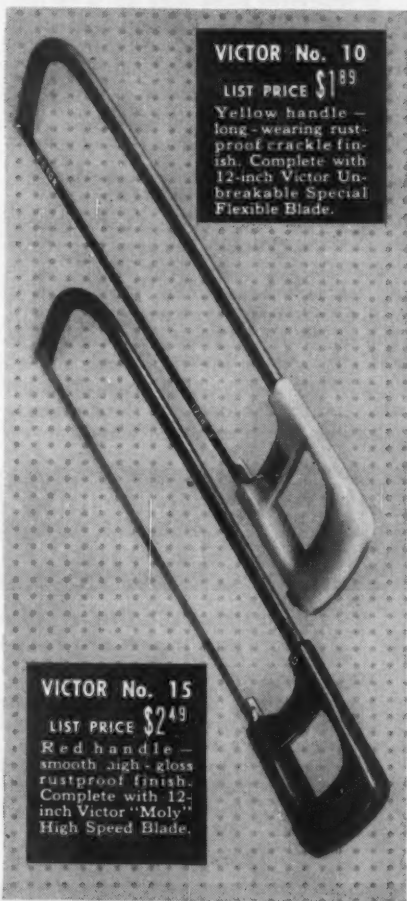
Long-time mechanics' favorite. Adjustable for 10-inch or 12-inch blades. Extra-leverage tension lock.

**Sold Only Through  
Recognized Distributors**

## VICTOR No. 10

LIST PRICE \$1<sup>89</sup>

Yellow handle — long-wearing rust-proof crackle finish. Complete with 12-inch Victor Unbreakable Special Flexible Blade.



## VICTOR No. 15

LIST PRICE \$2<sup>49</sup>

Red handle — smooth high-gloss rustproof finish. Complete with 12-inch Victor "Moly" High Speed Blade.

# VICTOR

1414

SAW WORKS, INC. • MIDDLETOWN, N.Y., U.S.A.

Makers of Hand and Power Hack Saw Blades; Frames; Metal & Wood Cutting Band Saw Blades.

March, 1955

309

bending jobs, or short production runs. A roller of hardened and ground steel, with needle bearings, rolls on the outside circumference of the wire, strip, channel or tube to be formed as the hand lever is swung around the arbor.

It will form basic wire up to 1/4" dia. and multiples of smaller sizes, strip metal up to 3/4" by 1/8" and thin-walled tubing to 3/8" dia. A special feature is an attachment for coiling, curving and ringforming of wire and tubing.

Use ACTION Card, opposite page 64. Encircle No. 30

### Reinforced abrasive wheels

The Metal Removal Co., Dept. B, 1546 N. Orleans, Chicago, has devised a regular hard resin grinding wheel reinforced to take extreme peripheral as well as side bending or wedging stresses. These wheels, Saftex, are made as straight wheels in thicknesses of 1/8" to 1". They are available from 3" to 12" dia., and can be used for the same applications as conventional wheels.



Saftex is also available in 7" and 9" dia. as depressed center discs in 1/8, 3/16, 1/4, and 3/8" thicknesses for use on right angle grinders.

Use ACTION Card, opposite page 64. Encircle No. 31



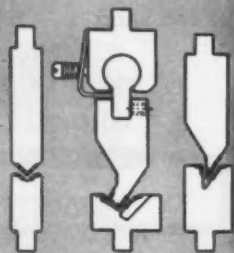
## INDUCTION HARDENED PRESS BRAKE DIES

**for greater die life at no extra cost  
on any make of press brake**

Whether it is a simple die for angle bending or the more complex dies for any of the combined bending and forming operations, CHICAGO induction-hardened dies offer bonus performance at no extra cost. Field reports on these dies show better than ten times the useful life of the conventional dies used in press brakes. Get the full particulars on CHICAGO dies for your next press brake job.

4515

**Steel Bending Brakes for over 50 Years**



Heavy lines  
indicate  
hardened surfaces

# DREIS & KRUMP

MANUFACTURING COMPANY

7448 S. Loomis Boulevard, Chicago 36, Illinois





# ARBOGA

(SWEDISH MADE)

## RADIAL DRILLS

**Bench and Floor Type**

**Geared Head**

## DRILL PRESSES

Arboga machines embody all the traditional workmanship of Swedish Machine Tools. *Very favorably priced.*

Many machines in plants all over the United States, where they are very popular and well accepted.

RADIAL DRILLS available in sizes of 24", 28", and 40".

DRILL PRESSES available in many different models, with accessories that will allow vertical milling.

**Please call or write to the following dealers in your territory:**

All American Machine Corp.

45 Crosby Street

New York 12, N. Y.

Tel. WAlker 5-8300

Joseph Beal & Company

87 Binney Street

Cambridge 42, Mass.

Tel. UNiversity 4-2813

Ralph Hochman & Company

52 Edison Place

Newark 2, N. J.

Tel. MITchell 3-8430

Hochman Machinery Company

119 North Third Street

Philadelphia 6, Pa.

Tel. MArket 7-6233

Star Machinery Company

241 Lander Street

Seattle 4, Wash.

Tel. ELliot 0760

Steel City Tool & Machinery Co.

3045 West Liberty Avenue

Pittsburgh 16, Pa.

Tel. LOcust 1-4011

Masters Precision Tools

3613 Archer Avenue

Chicago 9, Ill.

Tel. CLIFFside 4-7011

with additional sales outlets in:

River Grove, Ill.

Cincinnati, Cleveland, Toledo,

and Springfield, Ohio

Centerline and Grand Rapids,

Mich.

Mishawaka, Ind.

St. Louis, Mo.

Tulsa, Okla.

Racine and Milwaukee, Wis.

Minneapolis, Minn.

W & G Machine Co., Inc.

59 Van Ave., Milford, Conn.

Tel. MILford 2-0183

W. F. Wolf Machinery Co.

2910 Santa Fe Avenue

Los Angeles 58, Calif.

Tel. LOgan 3321

*Inquiries from dealers outside*

*above territories invited, these*

*should be sent to:*



# ERNEST GOTTSCHALK CO., Inc.

401 BROADWAY • NEW YORK 13, N. Y. • TEL. WORTH 6-0842

Manufacturer's exclusive U. S. Representatives

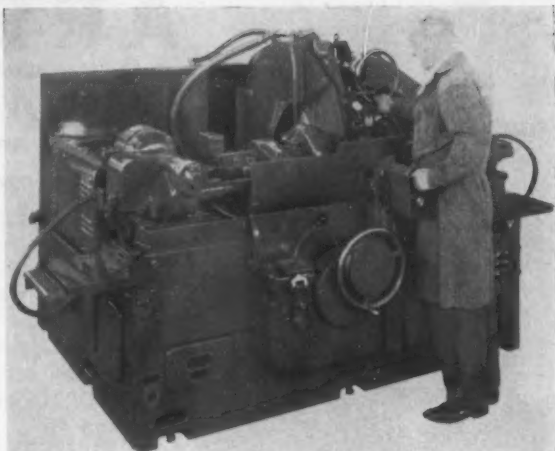


## Grinder For Small Crankshafts

A new precision grinder for finishing the pins of small crankshafts has been developed by Landis Tool Co., Dept. MTB, 36 E. Sixth St., Waynesboro, Pa.

Known as the 10" Type H crank pin grinder, it is available in two lengths between centers for either 16" or 34" crank lengths. Crankshafts are held at both ends in heads which are driven in unison. Clamping fixtures are hydraulically operated.

Both hand and hydraulic feed is provided for the grinding wheel head which carries a 36" diameter wheel. The wheel head will advance rapidly, slow down, for slow grinding of cheeks and pin



diameters. At a predetermined point the feed will stop, and after a spark-out period, reset to the back position.

Use ACTION Card, opposite page 64. Encircle No. 32

## Tapping attachment operates on weightless tapping principle

Tapmatic Corp., Dept. BB, 845 W. 16th St., Costa Mesa, Calif., has announced its "300" tapping attachment, operating on the spv weightless tapping principle. It does not require any spindle pressure by the machine operator during the tapping operation. The axial floating action is claimed to assure consistently uniform tapped holes. The dimensions and forms of the thread produced are now solely dependent on the tap itself.

The reduction of axial stress on the tap will increase its life. Tap breakage and work spoilage are also reduced by the positive torque control of the spring-loaded ball clutch. The function of this clutch is not affected by rpm variations, oil or heat, the manufacturer claims.

Attachment has only a 1 3/4" maximum diameter and 3 3/4" over-all length. Re-



versing mechanism permits instantaneous reversal of the tap at any time. Rated capacity for tapping in steel from No. 0 to No. 6.

Use ACTION Card, opposite page 64. Encircle No. 33

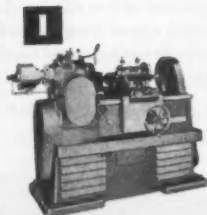
# CUT PRECISION THREADS FASTER

*with these 3*

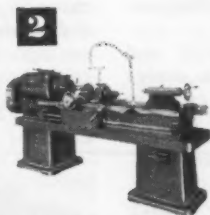
## COULTER AUTOMATICS!



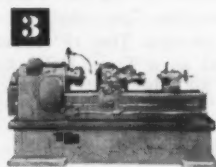
Wherever you spot a Coulter, you'll see production figures skyrocket, production costs plummet. Try ONE of these 3 Coulter Automatic Threading Machines — and you'll want all three!



**"H1"** Hob Thread Milling Machine ... for precision, internal and external threads ... **AUTOMATICALLY.**



**"L1"** Threading Lathe ... for precision, square, standard and 29 degree threads ... **AUTOMATICALLY.**



**"Threadmaster"** Thread Milling Machine ... for precision, long and short traversing, elevating, cross feed and lead screws ... **AUTOMATICALLY.**

Without obligation, consult our engineering staff with your specific threading problems. Catalog and machine specifications available upon request.

MACHINE TOOL BUILDERS SINCE 1896

The *James* **Coulter Machine Co.**

637 Iranistan Ave.

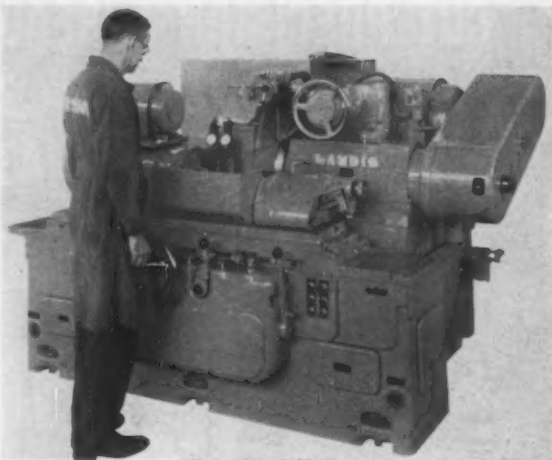
Bridgeport 5, Conn.

## Plain Cylindrical Grinder

A new series of plain hydraulic precision cylindrical grinders for finishing parts requiring the use of wide wheels or large diameter wheels has been developed by Landis Tool Co., 36 E. Sixth St., Waynesboro, Pa.

Wheels up to 10" wide for infeed grinding operations can be used, as well as spaced wheels for multiple diameter or profile grinding up to 10" from outside to outside of wheels. Some large diameter wheels workpieces requiring for clearance of webs can be handled on this machine using 36" diameter wheels.

Grinders are made in both 10" and 14" swings. The 10" machine is designated as a Type DCH and is made in 18", 36", 48", 72", 96" and 120" lengths



between centers. The 14" swing machine is designated as a Type LDCH and is made in the same lengths between centers. Longer lengths are made on special orders.

Use ACTION Card, opposite page 64. Encircle No. 34

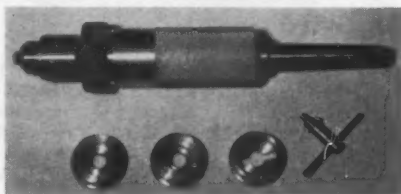
## Tool for small threads

Thread-Quill, for threading, tapping and drilling small precision threads on lathes, turret lathes and screw machines, is claimed to eliminate many second operations.

Unit makes it possible to control the forward travel of the drill, tap or die and "feel" any delay in the cutting action. A pressure release allows the tool and sleeve to spin with the workpiece.

When bed turrets on screw machines or turret lathes fail to locate in the same position tools can be floated in place of the fixed position method. Thread-Quill and its floating action is said to compensate for misalignment.

Supplied with a chuck (for drilling) and three button die adapters ( $\frac{3}{8}$ ",

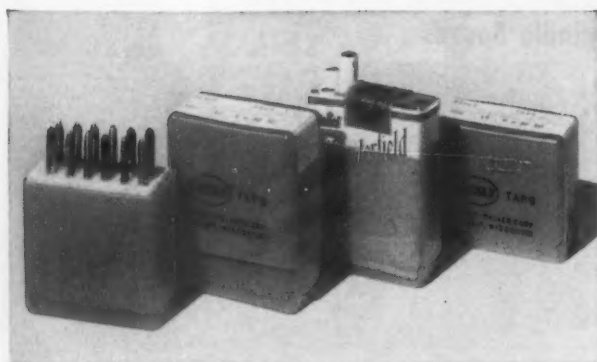


13/16" and 1") unit drills taps and threads 0-80 to  $\frac{1}{4}$ " holes on low machine rate alloy steel.

Lateral travel on the tool is  $1\frac{1}{2}$ ". The chuck adapter has a recessed back which locates in the center line of the spindle.

Distributor is D.S.C. Machine Co., Dept. MT, 29 Bertel Rd., Mount Vernon, N.Y.

Use ACTION Card, opposite page 64. Encircle No. 35



New Besly Tap Package not only protects taps from damage, but can also be re-used to hold cigarettes, fish-hooks or other small tools.

## MODERN TAP—MODERN PACKAGE

Now, Besly Tap quality is protected by a unique plastic "slip-together" case. It's so resilient it can be dropped or banged about without harming the taps inside. A plastic foam filler holds the taps firmly in position to prevent damage during shipment and storage.

Used to hold taps 0-80 through 5/16" in size, the new case even makes identification easier. It comes in different colors which indicate the type of tap inside.

Orange is used for high speed ground thread taps, red for high speed cut thread taps and white for carbon taps. An easy-to-read label on the top gives size, quantity, etc. The case is oil and grease resistant, is easily cleaned and will not deteriorate.

This new case is one more example of the greater quality you get when you order Besly Taps. Their accuracy at all vital points assures better threaded holes, faster cutting and longer life. But don't just take our word for it—see for yourself. Ask for a trial in your own plant—on the type of material you ordinarily tap. This is one trial that can mean big savings for you in machine time and tool costs. Call your Besly Distributor or write:



### BESLY-WELLES CORPORATION

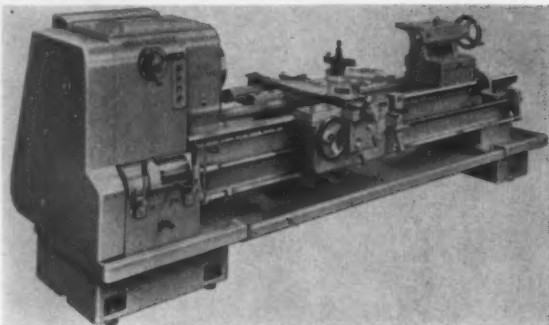
Established as CHARLES H. BESLY and COMPANY in 1875  
122 Dearborn Avenue  
Beloit, Wisconsin

## Lathes Have 12 Spindle Speeds

All-geared head, Tray-Top lathes swinging 21½" and 26" were announced by Cincinnati Lathe & Tool Co., Cincinnati 9, Ohio, recently.

Lathes have 12 spindle speeds in geometric progression, with a 3-lever, color-match, direct-reading shift mechanism. The spindle, with long taper key drive nose, is rigidly mounted in three precision anti-friction bearings.

Fifty-four thread and feed changes are made available through a totally



enclosed, automatically lubricated quick change gear box. The lathes are offered with a 5 or 7½ hp motor.

Use ACTION Card, opposite page 64. Encircle No. 38

## Vertical and radial holes drilled simultaneously

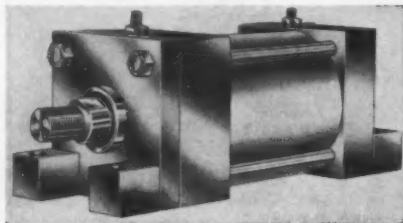
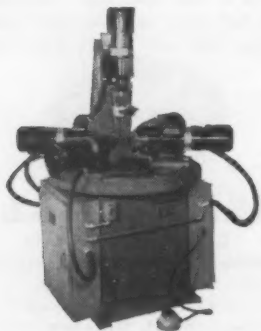
Originally designed for the drilling of radial holes, the machine illustrated has recently been changed to provide vertical drilling in addition to radial drilling. This has been accomplished by incorporating a vertical bracket which holds an automatic drilling unit with a multiple head, enabling it to drill 5 radial holes and 2 vertical holes simulta-

neously. The drilling units may be stationed around the circular table in any position required by the part being drilled, and they may also be moved endwise on riser plates. Machine has a range of 1/32" to ¾" on drilling operations and 0-80 and ¾-16 on tapping operations. Govro-Nelson Co., Dept. B, 1931 Antoinette, Detroit 8, Mich.

Use ACTION Card, opposite page 64. Encircle No. 37

## Cylinder mounting

A cylinder mounting consisting of square mounting lugs that mount flush with their standard square heads and caps to provide a space-saving mounting of strength and rigidity is being offered by Miller Fluid Power Co., Dept.

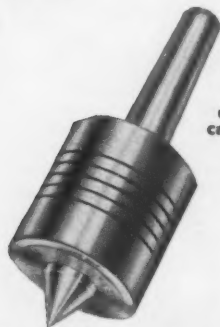


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**LIVE CENTER**  
 to do YOUR job best!

**STANDARD MODELS IN A COMPLETE  
 LINE DELIVERED FROM  
 DISTRIBUTORS STOCKS!**

When you choose IDEAL Live Centers you seldom have to resort to "specials" and the slow delivery and inventory problems they involve. You can handle practically any turning job with a *standard* IDEAL Live Center.

Top performance is also "standard" with IDEAL Live Centers. They have proven their accuracy and long life in tough service in shops all over the country where they are first choice! When you need a live center, you'll get the one you want, when you want it, easiest, from the complete IDEAL Line, stocked by your IDEAL Distributor.



**UNIVERSAL**

Accuracy to plus or minus .0001". Unusually high load capacity up to 5200 lbs. at 50 RPM. Morse tapers 2, 3, 4 and 5.\*

**\*IDEAL LIVE CENTERS ARE ALSO  
 AVAILABLE IN BROWN &  
 SHARPE AND JARNO TAPERS**

**Sold through Leading Distributors  
 In Canada: Irving Smith, Ltd., Montreal**



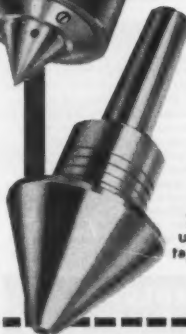
**MULTI-DUTY**

Interchangeable male, female and pipe points for centered and un-centered work. Nine sizes: Morse tapers 1 through 5, as well as straight.\* Loads to 1500 lbs. at 100 RPM.



**HEAVY DUTY**

For close tolerance turning jobs to 22,000 lbs. at 50 RPM. Eccentricity less than .0002". Morse tapers 4, 5, 6 and 7.\*



**NEW**

**PIPE POINT  
 LIVE CENTER**

For heavy turning work on pipes and other large, hollow cylinders. Sizes range from 3" diam. to 7 1/2" diam. Load capacities up to 22,000 lbs. Morse tapers 3, 4, 5, 6 and 7.\*

**IDEAL INDUSTRIES, Inc.**  
 1441 Park Avenue, Sycamore, Illinois



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TWO FOUR OZ. TUBES \$1.00**

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Chicago Manufacturing and Distributing Co.  
1906 West 46th St., Chicago 9, Illinois

**CHICAGO MANUFACTURING  
AND DISTRIBUTING CO.**

B, 2040 N. Hawthorne Ave., Melrose Pk., Ill.

Designated as Model 77, it is for side or foot mounting. Its mounting lugs are quickly installed and detachable for interchangeability with other Miller mounting attachments. Centerline height is precision machined to a tolerance of .002".

Use ACTION Card, opposite page 64. Encircle No. 38

**Dust collecting machine improved**

New model Duskolectors, Model CYO-8, for exhaust to the outdoors, and Model CYB-8, exhausted into three self-contained dust collecting bags, are suited for buffing, polishing, general grinding, plastics, etc.; will collect similar dust from multiple sources. Specifications: Motor, 5 hp; cfm, 2000; inlet dia., one 8" or two 6"; outlet dia., 9"; dimensions, 29" x 91". Hammond Machinery Builders, Inc., Dept. B, 1600 Douglas Ave., Kalamazoo, Mich.

Use ACTION Card, opposite page 64. Encircle No. 39



MACHINE and TOOL BLUE BOOK

## Automatic Education with Poster Slides for Accident Prevention and Cost Reduction

To reinforce the efforts of the supervisory organization in developing productive employee attitudes, and in reducing manufacturing costs and accidents, Mottershead Associates, Dept. BB, 933 E. 49th St., Chicago, has developed a new medium of employee education: safety and productivity impact posters in full color on standard 2x2 Kodachrome slides, which are projected from the rear onto a special translucent plastic screen in the Admatic automatic slide projector. Fully automatic, it projects 30 slides continuously, 24 hours a day if desired.

Automatic Education, as a continuous program, consists of a monthly package of 30 impact poster-slide messages, projected automatically on a 7-second interval in the Admatic automatic projector. The projector unit, which stands



approximately 5½ feet high, occupies floor space 28" wide and 18" deep. It shows a brilliant picture 16 x 23 inches

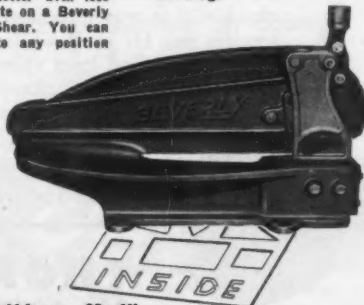
## Beverly THROATLESS SHEAR *Cut any Shape...* STRAIGHT OR IRREGULAR



B-3 with Ball  
Bearing Hold  
Down

Make any cut — curved, straight or irregular, faster, easier and better with less material waste on a Beverly Throatless Shear. You can turn work to any position

and make a clean cut as you go. Handles heavy gauges with ease—lighter metals without distortion. 4 models — capacities 18 gauge to 3/16" mild. All shears equipped with H.C. H.C. Blades for cutting Stainless.



### INSIDE SLOTTER

8" Reach — 16 ga. cop.

Makes inside slotting cutting faster, easier, cleaner. Punch and die arrangement of 8 blades assures accuracy, clean cutting action. Cuts 2½"x½" slot at one stroke. Throat design permits pivoting work at any point in stroke for special inside cuts. Note sample cuts at left.

See your Beverly Dealer or write for Illustrated catalog.

BEVERLY SHEAR MFG. CO., 3005 W. 111th ST., Chicago 43, ILL.



in size, clearly visible for 50 feet or more under any indoor lighting conditions.

In each monthly program, 15 poster-slides on a safety subject are intermixed with 15 poster messages on a productivity subject. Each set of slides has an accompanying training outline for use in foremen and supervisor training sessions. The projector has a stop-and-go

control so that any panel may be held in view during discussion, and then released to allow the next slide to be shown.

Subjects include safety topics such as "Be Alert," "Good Housekeeping," "Falls," "Correct Lifting," "Sight-Savers," "Hand Tools," "Safety Styles," "Follow Safety Rules," and "Play It Safe Today."

Productivity subjects include such topics as "New Ways Work," "We Are All Salesmen," "Stop Waste," "Work Together," "Your Job Is Important," "Be A Good Neighbor," "Compete Better to Live Better," "Keep Equipment Running," and "Produce For Prosperity."

The projectors may be purchased either outright or on a rental-purchase plan. Poster slides are sold outright either on a subscription basis, in bulk, or on a single set basis.

Use ACTION Card, opposite page 64. Encircle No. 40

## *Labor Saving* Production CHUCK

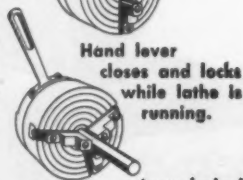
**Will pay for itself in 60 to 90 days**

On turrets, engine lathes, cutting-off machines, drill presses or any type of chucking machine, the Barker Two-Jaw or Three-Jaw hand operated chuck will increase production up to one third and actually pay for itself while doing it in from 60 to 90 days. Hand lever eliminates pneumatic and hydraulic systems, yet closes and locks jaws with lathe running or stopped. Over 30 years of labor saving, production boosting operation.

*Write for bulletin 201 today.*



Top  
Jaws  
open



Hand lever  
closes and locks  
while lathe is  
running.

Jaws locked

CHUCK DIVISION  
**THOMAS HOIST CO.**  
24 S. HOYNE CHICAGO 12, ILL.

### **Stainless steel clamp**

The stainless steel Sure-Tite clamp with Wittek worm drive design is detachable, can be applied quickly to hose which is already in position.

One-piece housing is compact and



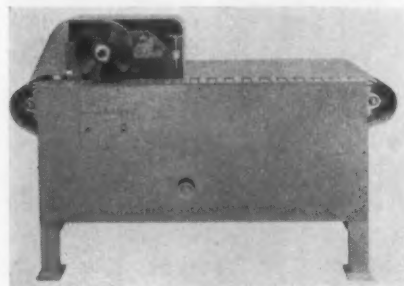
enclosed to permit the proper band width and flexibility for leakproof sealing. Wittek Manufacturing Co., Dept. B, 4305 West 24th Place, Chicago 23, Ill.

Use ACTION Card, opposite page 64. Encircle No. 41

### **Marking machine prints objects up to 30" long**

Complete label detail including a trademark or other design can be printed in one operation on flat objects up to 30" long, with a recently introduced machine.

Objects are manually fed to a con-



# **ECONOMY**



*Another Name  
For Precision—  
Performance—Fit*

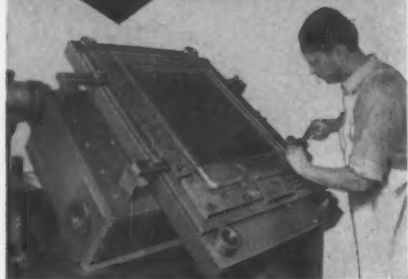
- ✓ "TRU-LOC" ADJUSTABLE  
ADAPTER SLEEVES & NUTS
- ✓ A.S.A. DRILL JIG BUSHINGS
- ✓ A.G.D. PLUG & RING GAGES

Prompt service on deliveries is a certainty at "Economy," with all items regularly stocked.

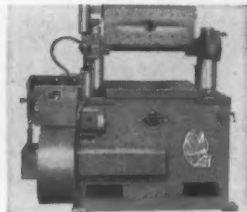
**Economy**  
TOOL & MACHINE CO.

1929 S. 68th St., Milwaukee 14, Wis.

**The modern way to  
tryout and finish dies  
is the ALPHA way**

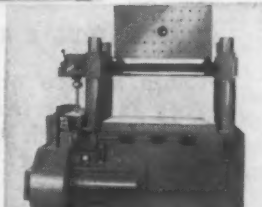


Barber, shear, fit and finish both die members without removing dies from the press. That is why you get faster, more economical production with Alpha Die Tryout Presses.



**2 post press  
50, 75, 100  
tons**

**4 post press  
100, 150,  
200 tons**



Full details in this free, illustrated folder.

**ALPHA**  
**PRESS & MACHINE, INC.**  
9281 Freeland Ave., Detroit, 26, Mich.

veyor belt on the Model 65A machine, which then carries them beneath a special die roll equipped with a sponge-backed rubber printing plate. Multiple printing heads are also available for multiple color imprinting. Maximum size of imprint is 1 $\frac{3}{4}$ " wide by 30" long. Markem Machine Co., Dept. BB, Keene 47, N.H.

Use ACTION Card, opposite page 64. Encircle No. 42

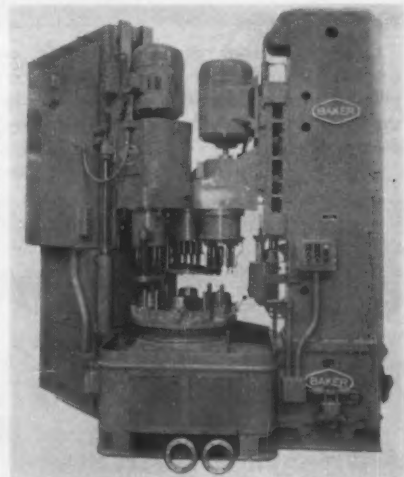
### **Special machine performs 30 operations**

The new Baker special machine illustrated performs 30 operations on differential ring gears for the manufacture of a popular make automobile.

The machine spot drills to chamfer, drills, and taps eight blind holes in steel. Individual leadscrew tapper has magnetic clutch control. Estimated parts per hour is 144.

The Model 26 HO unit is used for the drilling and features twin pull cylinder construction. Sample parts can be seen at the front of the machine. Baker Brothers, Inc., Dept. B, 1000 Post St., Toledo 10, Ohio.

Use ACTION Card, opposite page 64. Encircle No. 43



## Sub-zero chilling machine

A large capacity chilling machine has been announced by Cincinnati Sub-Zero Products, Dept. BB, 3930 Reading Rd., Cincinnati 29, Ohio. The chilling chamber size is 36" x 42" x 36" deep providing 27 cubic feet of usable space. Exclusive of an outside mounted agitator motor, the overall dimensions of the machine are 96" long x 60" wide x 48" high.

Adjustable temperature control is provided from -70° to -150°F. Thermal capacity is 8000 BTU's/hr at 120° below zero. This is sufficient to chill 200 lb. of steel per hour from +80 to -120°.

The unit is specifically designed for large heat treating operations.

For use with convection fluid, a 1/3 hp agitator is mounted in the left rear corner of the chilling chamber. A draft tube and fillet on the agitator provide for controlled flow of convection fluid and uniform rapid cooling, it is claimed. For draining of convection fluid, a 3/4" drain has been placed in the bottom of the chilling chamber leading out to a valve in the rear.

When the unit is used without convection fluid, an air circulator mounted in the lid, with inlet and outlet ducts entering directly into the chilling chamber, speeds chilling and prevents stratification of air.

Instrumentation consists of a recording controlling thermometer graduated from -150° to +50°F.

Use ACTION Card, opposite page 64, Encircle No. 44

## Horizontal disc grinder

An 18" horizontal disc grinder, No. 188, intended for quick freehand grinding of a single flat surface on many small parts, has been designed by Gardner Machine Co., Dept. BB, Beloit, Wis.

The vertical spindle which carries the grinding wheel is mounted in anti-friction bearings. It is driven through

Advertisement

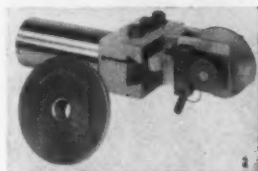
## Screw Machine Attachment Eliminates Separate Marking Operations

Automatic die marking of part numbers, patent numbers, trade marks, etc., during the operating cycle of automatic and hand operated screw machines, bench and turret lathes, etc., on almost any surface of a part is possible with the complete line of automatic roll markers available from New Method Steel Stamps, Inc., 147 Joseph Campau, Detroit 7, Michigan.

Suitable for both light and heavy work, the markers are practically fool-proof and eliminate the need for separate setups for marking, thus reducing cost, scrap, etc. Quick interchangeable roll dies give remarkable versatility and reduce time for setup changeover.



1. Model 500-C for automatically marking on outside cylindrical surface of screw machine parts.



2. Model 600-E for marking on the end face of parts. Normally installed in tailstock of a screw machine or similar position on other machines.

Illustrated are two of the three basic models of the cost cutting markers. Model 700 (not shown) is for marking and cutting off at the same time. The marker occupies the cutoff slide, leaving other stations open for machining operations. New Method also manufactures a complete line of hand stamps, inspectors stamps, embossing dies, marking hammers, type and type holders, etc. Precision marking and engraving services available.

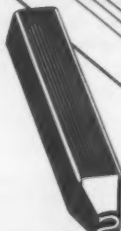




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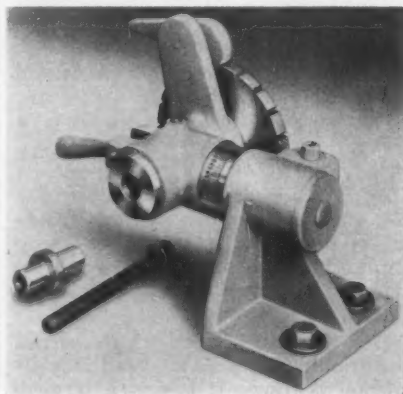


multiple V-belts from a 5 hp motor mounted on a hinged plate for easy belt adjustment. A guard encloses the motor and the drive. Outlet for attaching dust collecting system is built into the base.

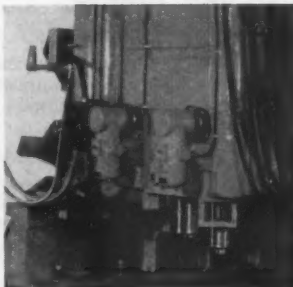
Use ACTION Card, opposite page 64. Encircle No. 45

### Universal indexing work holder

Simplicity of design and use is featured by the production tool division of Johnson & Bassett, Inc., Dept. BB,



## Another Use For The FEN Automatic Wrench —



Illustrated above are two Model 2M Fen Automatic Wrenches operating quills on a Mott and Merryweather Heavy Duty Tank Milling Machine.

For detailed information regarding the application of the Fen Automatic Wrench to your machines, phone, wire or write.

The Fen Automatic Wrenches are being used to move and position quills on heavy duty milling machines. These wrenches are built with a dual torque range; thereby enabling the quill to be moved vertically upward with the higher torque and with the lower torque the quill can be lowered gently to a stop.

### THE FEN MACHINE COMPANY

28915 Lakeland Boulevard  
Wickliffe, Ohio

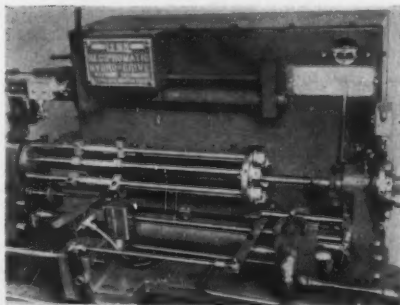
Worcester, Mass., in its new indexing work holder for use on milling machines and pantographs.

Small and light-weight, the Model MT-1300 holds work up to six in. dia. of any face width. The work is mounted on a simple fixture, and held by a draw bar through the hollow spindle. The spindle itself may be locked in any position, and the graduated swivel joint allows the work to be pivoted and clamped in any position from horizontal to vertical. Index plates are changed by removing a single nut, and are available with any number up to 60 notches.

Use ACTION Card, opposite page 64. Encircle No. 46

#### Drive has reciprocating action

A drive for ram type turret lathes with automatic reciprocating action to clear chips in deep hole drilling has been introduced by Lincoln Industries, Dept. B, 1121 S. 7th St., Minneapolis, Minn.



Called the "Lynn recipromatic hydraulic-drive" it provides an automatic cycle for withdrawing the deep hole drill from the work to clear the chips. The drill then re-enters the hole at rapid traverse to the depth of the cut and continues to drill at normal feed until the chip clearing cycle is repeated. This action can be applied to any, or all, of the turret stations.

Use ACTION Card, opposite page 64. Encircle No. 47



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Here are the sharpest, cleanest cutting machine hack saw blades ever made! They are completely *new*—made by *new* methods, *newly* designed equipment. They meet your *toughest* production requirements for long life and economy.

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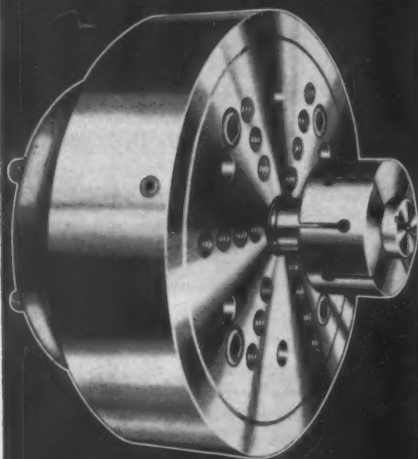
Get your Disston Distributor to make a comparison test in your shop—on your machines. Let practical results—not claims—convince you. Ask him about Disston's complete line of Hand Hack Saw Blades and Frames—and get overall economy.

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Henry Disston & Sons, Inc., 349 Tacony, Philadelphia 35, Pa., U. S. A.

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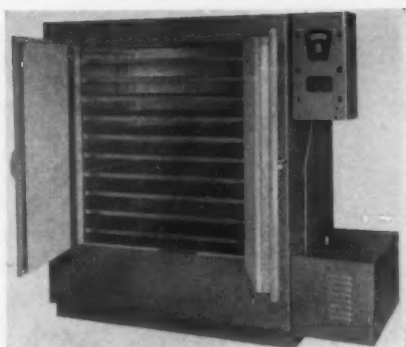


# SPEEDGRIP CHUCK

820 N. WARD STREET  
ELKHART, INDIANA

The Huppert electric recirculating oven is designed for a maximum temperature of 650° F. Open type elements are located in the bottom of the oven, and the air is recirculated by one or two stainless steel blowers, depending upon the size of the unit. The motor to drive the blowers is installed in an easily accessible ventilated cabinet. K. H. Huppert Co., 6845 Cottage Grove Ave., Chicago, Ill.

Use ACTION Card, opposite page 64. Encircle No. 49



### Combination hardness tester and measuring microscope

A combined hardness tester and measuring microscope features the Leitz micro hardness tester for testing small or thin parts, fine wires, cutting edges of tools, drills, taps, and for the surface

layers of nitrated or case hardened work. Indentation is by means of a Vickers diamond which makes an indentation visible at 400X magnification.

Measurement of the indentation is by means of a graduated ocular enabling the measurement to .0005mm. When intended for use as a measuring

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Procunier tappers are the solution to steadily rising production costs on many tapping operations. They have the unique construction features that permit inexperienced operators to tap like experts. In addition, they provide many extra hours of continuous, accurate tapping without frequent "down-time" interruptions, producing more pieces with fewer rejections, less spoilage and a minimum of broken taps.

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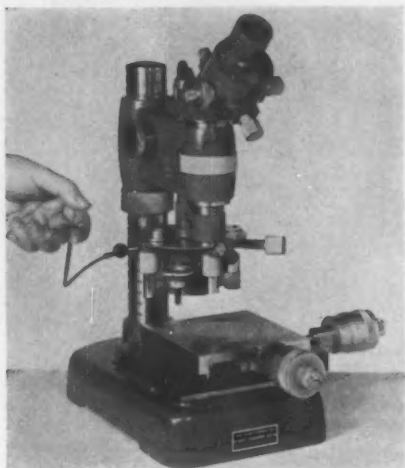
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 Tap Holder

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microscope, the 100X magnification lens is used. A special micrometer cross slide stage, equipped with heavy-duty 1" micrometer drums graduated di-

rectly in .0001" without vernier, with a total measuring range of 2" x 1½" has been fitted to the instrument.

Additional capacity is obtained by the use of gage blocks or other masters. Because of the high 100X magnification and the .0001" graduations, coordinate measurements can be made in tenths and repeated. George Scherr Co., 200 MTD Lafayette St., New York 12.

Use ACTION Card, opposite page 64. Encircle No. 58

### Compact cutter grinder

For sharpening of single-flute milling or engraving cutters, a compact machine has been announced by the production tool division of Johnson & Bassett, Inc., Dept. B, Worcester, Mass., the Model MT, 1100.

It requires working-space only 14½ inches high, in an area 15 inches square.

Built-in diamond wheel-dresser is mounted on the wheel-guard, allowing the wheel to be dressed without disturb-

## ROOFE Heavy Duty BULL NOSE CENTERS

Two double rows of ball bearings in the large and small ends of this Bull Nose Center mean perfect alignment on any type of work.



## Guarantee Perfect Alignment

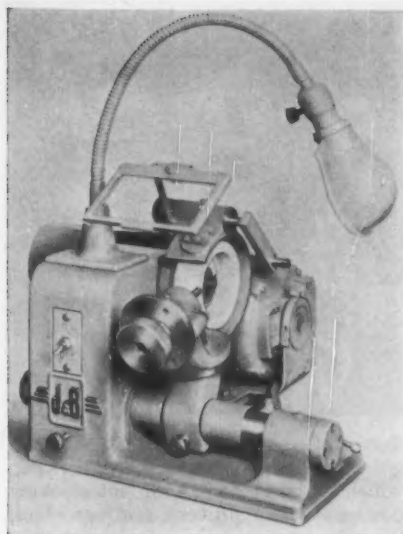
Two shank sizes provide diameters from ½" to 7½" for a variety of work with a single center. Write for catalog.

Distributors Wanted.

# HOUSTON GRINDING & MFG., CO., Inc.

2110 QUITMAN STREET •

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ing the tool head. Four ball bearings

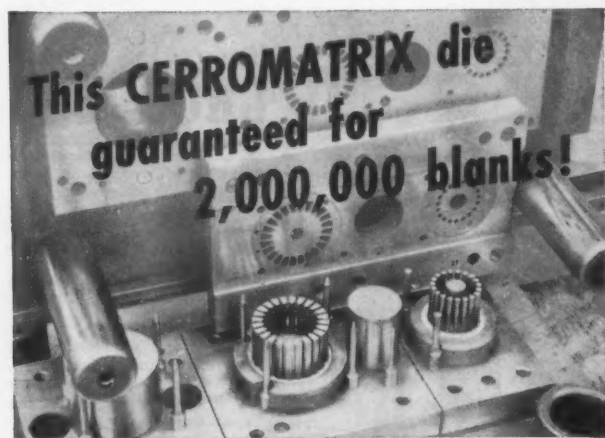
eliminate end play in the sealed spindle, and the sliding sleeve is dustproof.

The rocking head is controlled by a thumb screw in the base. Index plunger and dial in tool head accommodates indexing 1, 2, 3, or 4 sides or flats. The standard spring collet receives cutter shanks up to  $\frac{1}{2}$ " dia.

Use ACTION Card, opposite page 64. Encircle No. 51

### Compound lever clamp

A compound lever clamp for holding work on milling machines, planers,



Lang tool & Die LCo., Glendale, Calif., uses Cerromatrix to anchor small punches in high production lamination dies, which they guarantee for 2,000,000 blanks. The photograph shows a die for rotor and stator blanks which runs 135 strokes per minute. Send for literature.

Visit Booth 558,  
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## CERRO DE PASCO CORPORATION



Dept. 7, 40 Wall St.

New York 5, N. Y.



shapers, radial drills, boring mills or any metalworking machinery having T-Slots in the work table has been developed by Lawrence and Hill, Inc., Dept. BB, Watertown, N. Y.

Clamp can be adjusted to exert any desired holding pressure on the work; it can be set at any angle on the work table. Models are designed for use in  $\frac{1}{8}$ ",  $\frac{1}{2}$ " and  $\frac{3}{4}$ " T-slots. One advantage of the clamp is the rapidity with which work can be changed in or out of the machine.

Use ACTION Card, opposite page 64. Encircle No. 52

### Nylined bearing liners

Thomson Industries, Inc., Dept. B, Manhasset, N.Y., who developed the Nylined bearing which is used primarily where no lubrication is possible or where increased wear resistance is required, have supplemented the line by making available the liners of the bearing only.

They are offered in two types. Those



that are used where lubrication is required have a spiral compensation gap which is provided with interlocking portions which prevent the loss of oil from the ends of the bearing after it has been circulated through the oil dis-



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for free  
grooving and  
production  
estimate



## Fischer . . . OIL GROOVERS

The FISCHER No. 1 Oil Groover cuts a wide variety of grooves in bearings up to 8" in length and up to 5" inside diameter. A few simple settings permit you to cut continuous, relieved, straight or spiral grooves at any angle from parallel to perpendicular to the work. Grooves may also be cut in shafts, housings, etc.

This machine will slash grooving time and deliver continuous profitable production in your shop. It will pay to find out what it can do on your grooving jobs.

ESTABLISHED 1900



# FISCHER MACHINE CO.

ELEVENTH and WOOD STREETS — PHILADELPHIA 7, PA.

tribution slot. A simplified liner, having either a straight or a spiral compensation gap, and without the interlock or oil distribution grooves, is also offered. Use ACTION Card, opposite page 64. Encircle No. 53

### Keyhole drift slot for spindle-type machine tools

A tool ejection method for spindle-type machine tools incorporates new style drift slots and Keyhole tool ejectors.

Advantage claimed for the Keyhole design is that it eliminates damage to machine bearings and spindles often caused by hammering.

Slot design consists of a round top portion which serves as a bushing for the key and a rectangular slot to permit use of conventional drifts should a tool or adapter become jammed in the spindle.

The cam-shaped tip of the ejector rotates against the top of the tang, pushing the tool from the spindle in one

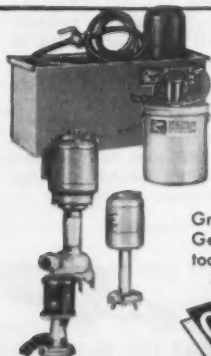


motion. Ejectors are available in five standard sizes for Nos. 1, 2, 3, 4 and 5 Morse taper spindles. Scully-Jones and Co., Dept. B, 1901 Rockwell St., Chicago, Ill.

Use ACTION Card, opposite page 64. Encircle No. 54

*Only...*

## GRAYMILLS COOLANT PUMPS give you ALL these advantages



- Complete systems, with fittings, to fit any standard machine tool
- Easily installed—in a manner of minutes
- A size for every need—38 standard models—Pumps only or Pump and Tank Units
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Graymills Centrifugal pumps, for high volume at low pressures, or Graymills Gear pumps where high pressures are desired, are ideal for every machine tool application—for coolants, oils and compounds. Tank capacities range from 2 to 128 gals. Motors are of nationally known quality in 1/25, 1/8, 1/4 and 1/2 H.P., totally enclosed or drip-proof.

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Write For Catalog D

The machine shown here was built by Rehnberg-Jacobson, to perform a series of drilling, tapping, and reaming operations.



## MAKE IT YOURSELF?

*You can do it with* **R-J UNITS**

Rehnberg-Jacobson ALL-MECHANICAL Drill, Tap, and Index Units are specially designed for YOU to use for making up YOUR OWN special-purpose machines — or for adding to or modifying some of the special-purpose (or standard) machines you now have. They are accurate, efficient, economical — and available in enough models and sizes to suit most every need. **WRITE TODAY** for Data Sheets giving complete engineering information.

**TAP UNITS**, for example, are made in four capacities from 5/16 - 18 and 1-1/4" stroke to 1-1/2 - 6 and 4-1/2" stroke. They are self-contained, with lead screw feed.

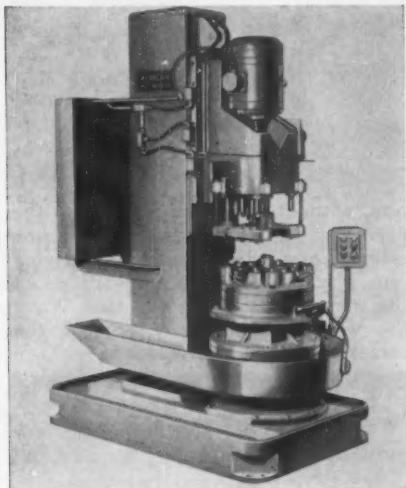


**REHNBERG-JACOBSON MFG. COMPANY**

2135 KISHWAUKEE ST., ROCKFORD, ILLINOIS

## Way-type hydraulic feed machine

A standard way-type hydraulic feed machine, Hydro 3, has a cast iron base with built-in coolant tank, chip trough and cleanout. The welded steel column has hardened and ground ways. Width of the ways is 7½"; stroke, 10"; feed thrust, 3100 lb.; the ways are automatically lubricated. The motor mounting brackets are capable of mounting 7½



hp 1200 rpm electric motors, which is the maximum for this machine.

Index tables are available, driven by a fluid-drive motor. There are three sizes—20", 30", and 42", and can be bored for any number of stations ranging from two to fifteen. Michigan Drill Head Co., Dept. MTB, 917 E. 8 Mile Rd., Detroit, Mich.

Use ACTION Card, opposite page 64. Encircle No. 55

## Automatic driving center

An automatic driving center has been announced by Mera Machine & Mfg. Co., Dept 31, 221 Spring St., Elizabeth, N.J.

The workpiece can be removed and rechecked while the machine is run-

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9" FLUTE

12" HIGH SPEED 12"

Size	Price Each
1/8" x 12"	\$2.06
9/64" x 12"	2.06
5/32" x 12"	2.06
11/64" x 12"	2.06
3/16" x 12"	2.06
13/64" x 12"	2.19
7/32" x 12"	2.19
15/64" x 12"	2.40
1/4" x 12"	2.40
17/64" x 12"	2.55
9/32" x 12"	2.55
19/64" x 12"	2.75
5/16" x 12"	2.75
21/64" x 12"	3.11
11/32" x 12"	3.11
23/64" x 12"	3.46
3/8" x 12"	3.46
25/64" x 12"	3.81
13/32" x 12"	3.81
27/64" x 12"	4.17
7/16" x 12"	4.17
29/64" x 12"	4.52
15/32" x 12"	4.52
31/64" x 12"	4.52
1/2" x 12"	4.52

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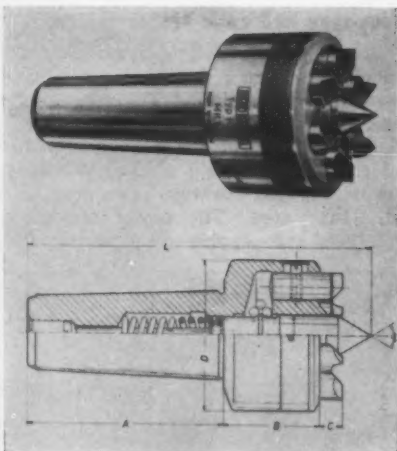
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ning without danger of injuries to the operator; job can be finished in one setup. Longitudinally movable driving pins grip the workpiece regardless of the irregularities of its end face. When the workpiece has been gripped, the center is automatically locked.

Use ACTION Card, opposite page 64. Encircle No. 50

## Multi-mount for flexible grinding wheel

Grind-O-Flex flexible grinding wheel is now available in multiple wheel units. Three of these wheels (or more) may be mounted together to form a single broad wheel. Merit Products, Dept. B, 4023 Irving Place, Culver City, Calif.

Use ACTION Card, opposite page 64. Encircle No. 57



## DORMAN AUTOMATIC REVERSE TAPPERS



• AUTOMATIC TORQUE CONTROL . . . One Minute to Adjust . . . Prevents Tap Breakage . . . Operator Need Not Be Skilled.

• WIDE RANGE TAP CAPACITY No. 1 FRICTION DRIVE TAP-

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50 to 1/2" in Steel  
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TAPPER—capacity  
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No. 3A POSITIVE TAPPER—  
capacity 1/2" to 1 1/4" in Steel.  
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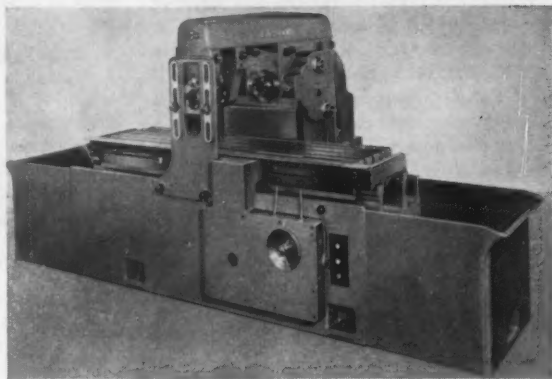
1030 N. PLUM STREET, LANCASTER, PA.

STANDARD UNIVERSAL ADJUSTABLE AND SPECIAL FIXED CENTER DRILLHEADS

## Heavy Duty Bed Type Milling Machines

A line of heavy duty bed type milling machines, HyPowermatics, recently developed by the Cincinnati Milling Machine Co., Dept. B, Cincinnati 9, Ohio, have automatic two-way table feed cycles and infinitely variable feed rates. Cutting capacity is up to 50-hp and spindles speeds up to 2000 rpm for taking conventional milling or climb milling cuts with either high speed steel or sintered carbide milling cutters.

Standard machines, designated the 300, 400 and 500 series, are built in plain and duplex styles in 42 sizes of each, from 36" table travel, 7½ hp to 168" table travel, up to 50 hp.

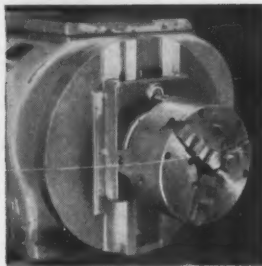


The bed ways are long, hardened and ground to an accurate bearing with the sliding table. Ways are square gibbed.

Feed rates, ¼" to 100" or 150" per minute. The table is driven by a new

## MICRO-CHUCK ALL-PURPOSE WORK-HOLDING TOOL

- SAVES TOOLING COSTS
- SAVES HOURS OF SET-UP TIME



Forget high-cost, time-consuming custom tooling for special machining jobs or new products—now MICRO-CHUCK offers a universal work-holding assembly that can be used time and time again for tooling up all different kinds of work such as castings, forgings, or odd-shaped parts. MICRO-CHUCK fits right on your present lathe; or use attachments on other machines such as drill presses, grinders, shapers, boring and milling machines. Work is brought quickly and securely to exact spindle center with two simple adjustments, or moved off-center up to 4 inches. Some of the many work-holding attachments available are shown below—so inexpensive they're expendable.

MICRO-CHUCK illustrated with three jaw universal chuck. For precision off-center drilling, reaming or boring; for turning cams, or other eccentric work. Use on milling machines as offset boring head. MICRO-CHUCKS available to fit any machine of 9" swing or over.



**WRITE FOR FREE ILLUSTRATED FOLDER AND PRICE LIST NO. 205**

**MICRO-CHUCK** Division, Scott-Browne Corp.  
Batavia Pike • Newtown, Ohio  
In Greater Cincinnati, The Machine Tool Center of The World



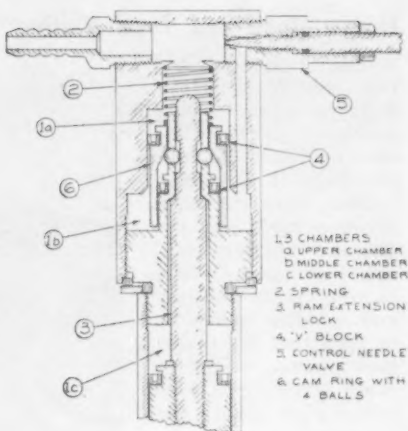
type of unit, Hydramech. It consists primarily of a hydraulic motor, with an infinitely variable arrangement, driving a worm and dual worm wheel which in turn drives twin vertical pinions engaging the table rack.

Sixteen spindle speeds can be obtained through change gears and a back gear combination. A choice of nine ranges of spindle speeds are available. The highest group ranges from 50 to 2000 rpm for 300 Series spindle carriers, 30 to 1200 rpm for 400 Series spindle carriers and 20 to 800 rpm for 500 Series spindle carriers.

Use ACTION Card, opposite page 64. Encircle No. 59

### Air trip for air impact hammer

A more effective method of releasing the hammer blow has been incorporated in the Mead air impact hammer. Whereas formerly spring tension on a trigger mechanism was relied upon to release the piston, now the same result is ac-

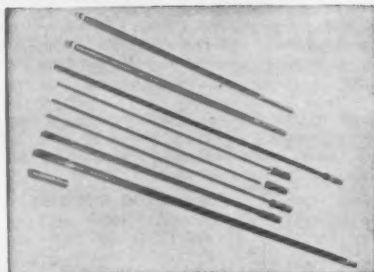


complished by air pressure. The force of the blow is increased; replacement of worn mechanical parts reduced.

Adjustment of the force of the hammer blow can be made while the ham-

## Deep Hole Drills

- SOLID TUNGSTEN CARBIDE TIPS
- CARBIDE INSERTS WITH WEAR STRIPS
- SHANKS OF 4130 ALLOY TUBING ROLLED WITH A "V" GROOVE OR A RADIUS
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mer is in action. Mead Specialties Co., Dept. AT-6, 4114 N. Knox Ave., Chicago 41, Ill.

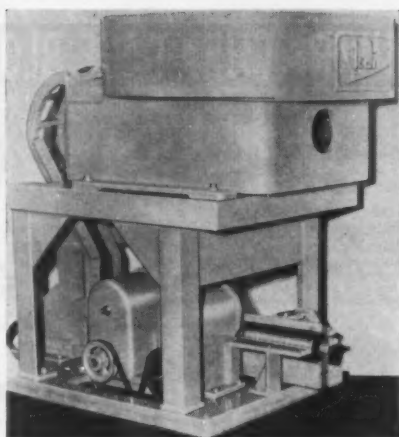
Use ACTION Card, opposite page 64. Encircle No. 60

### Grinding operations automated for bearing races

Kraus Design, Inc., 934 Exchange St., Rochester 8, N.Y., has announced an automatic Thru-Feeder which was developed to automate the centerless grinding operations for bearing races.

The parts are delivered from the Centri-feed hopper with their axes parallel. A stacking device then arranges the parts with their axes aligned and feeds them into a dual pair of feed discs which carry the parts to the grinder work rest and, by maintaining a constant and pre-determined pressure, maintain squareness and taper requirements.

There are carbide wear inserts on



all four guide rails. The F-4 model will accommodate races or similar parts from  $\frac{3}{8}$ " to  $1\frac{1}{4}$ " dia., while the F-7 will handle parts from  $1\frac{1}{4}$ " to 3" dia.

Use ACTION Card, opposite page 64. Encircle No. 61



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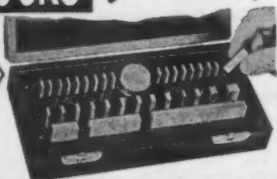
## ULTRA-CHEX GAGE BLOCKS *for Every Need!*

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34 BLOCK SET (shown) **\$125** INCL. OPT. PARALLEL

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**9 Block Set**

For Individual Mechanic

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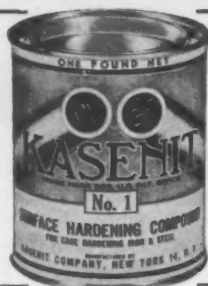
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200-MT LAFAYETTE STREET • NEW YORK 12, N. Y.



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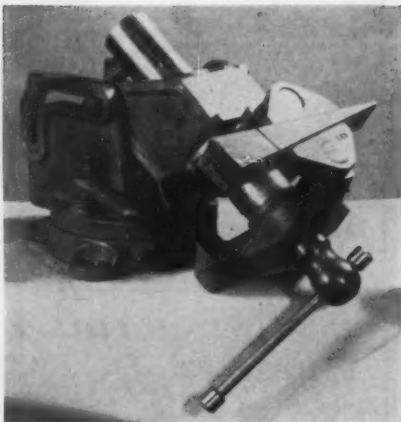
Arcadia, Calif.



## Vise is adaptable to many demands

The Uni-Machinist vise is claimed to present unlimited combinations of holding jaws. One pair is used for fitting and filing; one for round or finish work; one for rings, segments, hollow parts, or irregular shapes; one for tapers, round or square, and for smaller metal rods; one for cylinders.

Jaws may be used independently or in combination. Maximum gripping dimension is eight inches. Double lead thread on the clamping screw is claimed to pro-



vide unusual gripping action. Emmert Mfg. Co., Dept. BB, W. Main St., Waynesboro, Pa.

Use ACTION Card, opposite page 64. Encircle No. 69

## SPEED UP YOUR HANDLING OF HEX HOLLOW-HEAD SET SCREWS

## AND CAP SCREWS WITH THE NEW

**WALDEN**

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TRADE MARK

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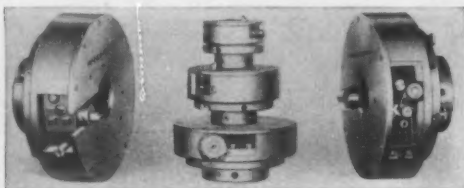
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MAKERS OF SPINTITES, GRIP  
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SOCKET WRENCHES — AND ALL  
TYPES OF MECHANICS' HAND TOOLS

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**50**  
YEARS

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## MUMMERT-DIXON FACING HEADS

with Automatic Feed

One-way Tool Feed—6, 9 and 10" sizes.

Two-way Tool Feed—9, 12, 16, 20, 24, 30, 36, 40 and 46" sizes.

Save many costly set-ups.

Bulletin No. 4141 Gives Full Details

MUMMERT-DIXON CO., 122 Philadelphia St., Hanover, Pa.

## INSTANT ACTION RAPIDSET

by HARTMANN

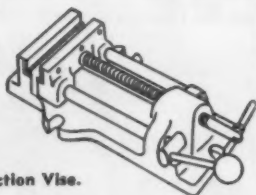
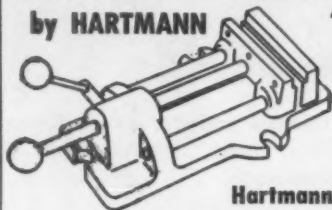
All Purpose Tool Room and Machine Shop Vises.

### The JAWSET

Adjustable Pressure Production Vise.

For Information Write Dept. M

Hartmann Mfg. Co., 1637 Gould St., Racine, Wisconsin



## BOSTON UNIVERSAL ANGLE PLATE

Puts Speed and Profit into Angular  
Drilling, Milling, Planing, Shaping, Grinding

A Precision Tool  
that Holds Work  
at Any Desired  
Angle.



Horizontal motion is 360 degrees; vertical motion, 120 degrees. Fitted with vernier scale reading to 5 minutes.

With a Boston Universal Angle Plate on the job, work is quickly set up on the table and but a few seconds are required to locate it at the desired angle. Indispensable in tool rooms and extremely useful in production runs, the Boston Universal pays for itself many times over by eliminating the necessity of expensive jigs and fixtures.

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US AUTOMATIC BOX MACHINERY CO., Inc.

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## WALTHAM CYLINDRICAL SUB-PRESSES

Dies for high precision work should not only be perfectly aligned but provision should be made to maintain that alignment throughout the life of the die. Our bulletin shows how it can be done.



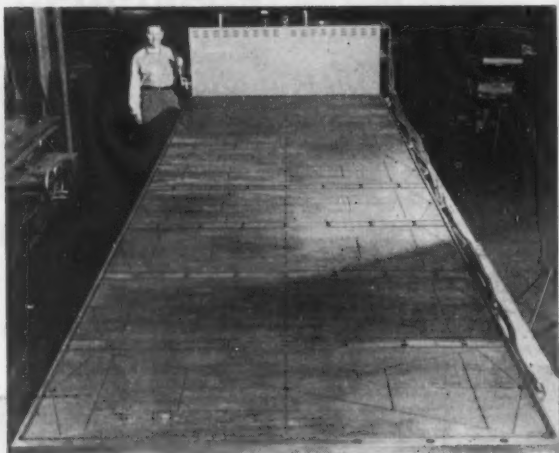
ARCH SUB-PRESS

WALTHAM MACHINE WORKS WALTHAM 34, MASS.

## Vacuum chuck sections used separately, together

The Walker vacuum chuck illustrated is 6' wide and 24' long and is divided into sections which may be controlled for different sizes of work pieces. Sections can be used collectively or individually and operate through a common manifold.

Chuck is designed with a definite pattern to equalize atmospheric pressure in order to eliminate the possibility of the work sealing off sections and not allowing the proper pressure to hold the work to the chuck. O. S. Walker Co., Inc., Dept. BB, Worcester



6, Mass.

Use ACTION Card, opposite page 64. Encircle No. 65

**WHOOOEE!**

YOU DON'T HAVE TO LOOK  
FAR TO DISCOVER  
W. H. O. \*

IS TOPS IN  
THE PRECISION  
SCREW MACHINE  
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FIELD.

CAP SCREWS  
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do you have a  
**TOOL PROBLEM**

Columbus Die-Tool has been solving tooling problems for over 45 years. Expert designers and builders of all types of tools and special machinery. Write us today!

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**ANGLE VISES**  
5 JAW  
SIZES

**SIZES**  
1 1/2"  
2 1/2"  
4"  
6"  
8"

All  
with  
**SWIVEL BASE**

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for **MILLING MACHINES,  
DRILL PRESSES,  
GRINDERS, SHAPERS...**

Built sturdy and  
rugged for tough  
heavy jobs. Accu-  
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Complete line of  
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**MILLING MACHINE VISES**  
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4" and 6" Jaws  
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## MICRO-HEIGHT GAUGE

BY **FAIRFIELD GAUGE CO.**



**NO OTHER GAUGE  
COMPARES FOR  
FAST, ACCURATE  
LAYOUT AND  
MEASURING**

Capacities to  
6" when used  
with this  
**Fairfield Gauge  
3" Riser**

The Micro-Height Gauge is a  
precision instrument, finished in  
satin chrome, which reads like a  
micrometer and measures from  
zero at base to 3" in thousandths.  
Use as a scribe for fast layout,  
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**ESSEX CARBIDE  
AND HIGH SPEED  
CUTTING TOOLS**

Carbide Rotary files—end mills—  
Reamers—milling cutters—counter-  
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shavers

Special carbide tools manufactured to  
specifications

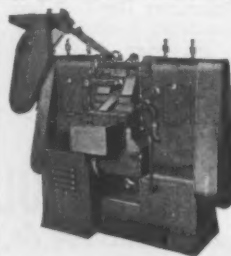
High speed steel counter sink cutters—  
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All high speed steel and carbide  
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295 Madison Ave. • New York 17, N. Y.



*for speedy drilling*

**OF COTTER PIN HOLES IN SCREWS, BOLTS, ETC.**

## The KENT Duplex DRILLER

Two drills move toward the center. One drill then withdraws  
and the other completes the hole. Parts can be drilled and  
countersunk at the same operation. Semi-automatic or full  
automatic feed. Write for illustrated descriptive literature.

**The KENT MACHINE CO.** Cuyahoga Falls, O.

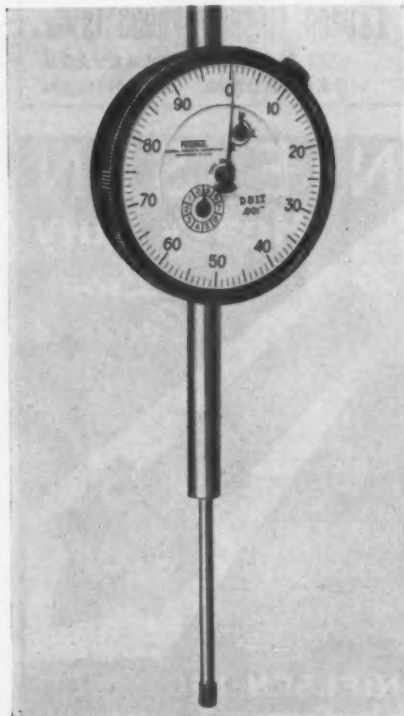
Drillers - Threaders - Slotters - Countersinkers - Bar Pointers

### Dial indicator has 2" range

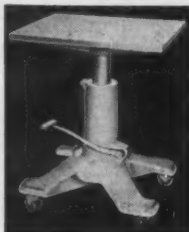
A dial indicator, Model D81T, that will measure two full inches in increments of .001" is being produced by Federal Products Corp., 2512 Eddy St., Providence, R.I.

Furnished in the "D" size (2¾" dia.), A.G.D.C. specifications have been followed throughout, except for the length of the stem, the dust cap, and rack. The indicator has two revolution counters. The first counter counts the revolutions of the large hand while the second counter tells how many times the first revolution has been around. An internal pullback spring makes it possible to use the indicator in either the horizontal or vertical position.

Use ACTION Card, opposite page 64. Encircle No. 70



### PORTABLE ELEVATING TABLE



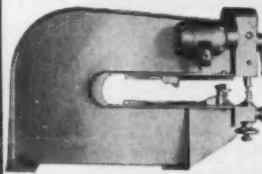
**Saves  
TIME  
and  
LABOR**

Eliminate heavy lifting and cut handling costs. Slight foot pressure varies height from 31" to 46½", leaving operator's hands free. Table swivels and locks in any position.

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112 WEBSTER ST., DAYTON, OHIO**

## G. V. METAL WORKER



285A

**Capacities  
MODELS  
285-A  
½ inches  
400-A  
15/64 inches  
490-A  
5/16 inches**

### *The Multi-Purpose Machine*

For use in Straight, Circle, and Free Cutting, Beading, Offsetting, Forming, Nibbling, Slotting, Louvering, Stretching, Shrinking, Etc.

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or  
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**LAY-OUT AND  
IDENTIFICATION DYE**



**7 COLORS**

For Tool, Die, Pattern or Template layout on metal . . . Quick identification of bar stock, sheets, strips or parts . . . Shows up in sharp relief—dries instantly . . . Write for sample and circular on company letterhead.

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CHEMICAL COMPANY**  
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**YOST DRILL PRESS VISE**



This new Yost vise has been designed expressly for use on drill press operations. Does away with special and costly jig fixtures.

Offered in two sizes.

Vise No.	Width of Jaw, inches	Opens inches	Weight Pounds
1D	3½	3½	12½
2D	5	5½	23

Do you need a vise of ANY type?  
*Write today for bulletins on the extensive Yost line*

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**THREAD  
RING  
GAGE  
BLANKS**



**In Stock! Immediate Delivery!**

100% guaranteed to meet the most rigid specifications of the American Gage Design Standards. Made from Graph-Mo Oil Hardening Tool Steel.

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**HURON MACHINE PRODUCTS Inc.**  
6252 MONROE BOULEVARD  
DEARBORN, MICHIGAN

**NIELSEN**  
**Heavy Duty**  
*Live Centers*



Write for catalog on live centers

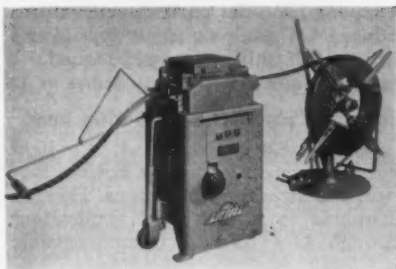
Adapted for heavy duty work. Precision type ball and roller bearings assure maximum capacity for high speed production and long service.

**NIELSEN, INC.** LAWTON, MICH.

### Variable speed straightening machine

A variable speed straightening machine has been designed by the F. J. Littell Machine Co., 4147 N. Ravenswood Ave., Chicago. This 208 machine handles ferrous and nonferrous stock and has 17 power-driven straightening rolls. Thin coil stock comes through the rolls with the curvature removed, ready for automatic feeding to the press.

The unit is also claimed effective in



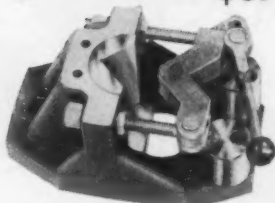
## LASSY

## WORK HOLDERS

Patented

**\$67.**

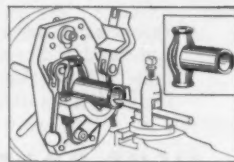
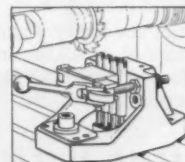
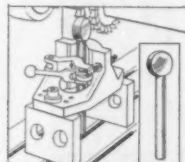
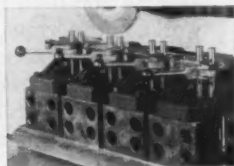
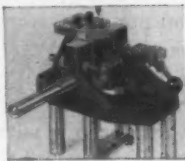
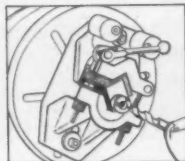
1. Save Hundreds of Tooling \$\$\$\$\$\$
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Model P2 Cap. 1/4" to 2"  
Other Models and sizes to 4" Cap.

**PLUS! Low Initial Cost  
Nothing Else Like It.**

Just a few of the many setups that can be made rapidly with Multi purpose Work Holders and STANDARD LOW COST Accessories



Order direct or write for name of Stocking Dealer in your area. Illustrated circular **FREE**

**LASSY TOOL CO.**

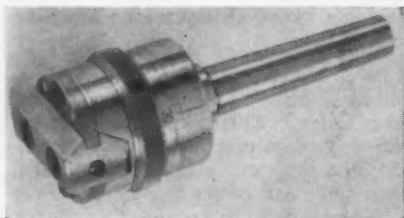
**Plainville, Conn.**

removing from flat parts the curvatures induced by stamping operations. Parts up to 3/32" thick are straightened.

Use ACTION Card, opposite page 64. Encls No. 64

### Light and medium duty boring head

The No. 820 boring head is a light and medium duty tool for boring, facing, and threading operations. Head is adaptable to a variety of applications through the use of interchangeable



shanks; compact symmetrical design



Since 1870



## DARL BASE

**FOR MORE  
ACCURATE  
MACHINING**

Fiske "DARL" Oil is a base cutting oil that has real flexibility. Fiske's "DARL" can be used straight or reduced with mineral oil to the degree suitable for the tool, the work and the metal. "DARL" works both ferrous and non-ferrous metals. It is non-corrosive, and permits visibility when mixed. Having exceptional anti-weld value, lubricity and high film strength, it is excellent in drawing and stamping, as well as for machining. Standardize with "DARL" and save money.

Information on each of the many Fiske Lubricating Specialties is available in bulletin form. Send for bulletins describing lubricants of interest to you.



## FISKE BROTHERS REFINING CO.

Newark 5, N. J. and Toledo 5, Ohio

**METAL WORKING LUBRICANTS**

features minimum overhang of the tool-holding slide bar.

The micrometer style adjusting collar with its widely spaced graduations is claimed to permit rapid and accurate direct reading adjustments. One complete revolution of the collar moves the tool holding slide bar .050" radially. Mico Instrument Co., 78 Trowbridge St., Cambridge, Mass.

Use ACTION Card, opposite page 64. Encircle No. 72

## WHITNEY EXTENSION ADAPTER for 17" DELTA DRILL PRESS

INCREASE  
working centers from  
17" to 25"  
or  
33" with dual extension



DUAL EXTENSION

WHITNEY MACHINE SHOP

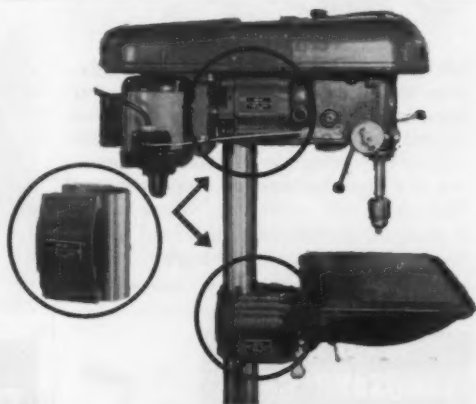


134 Good Street, Akron 4, Ohio

### Heavy-duty right angle bevel gear

A new heavier right angle bevel gear unit—2½ horsepower and with high load capacity—has been introduced by Airborne Accessories Corp., Hillside, N.J., as an addition to its line of ANGLgears. It will permit solving wider range of problems calling for right-angle power transmission through shafting, the manufacturer claims.

Available in either 2-way (Model R-



The WHITNEY EXTENSION ADAPTER fills the need for greater center to center capacity on a small drill press. It eliminates the need for a large, heavy duty press because of the working center needed.

No machine work required for installation. Can be installed or removed for use on other presses in just a few minutes. Accurately machined for perfect alignment. Fully guaranteed.

The WHITNEY EXTENSION ADAPTER fits all floor or table models.

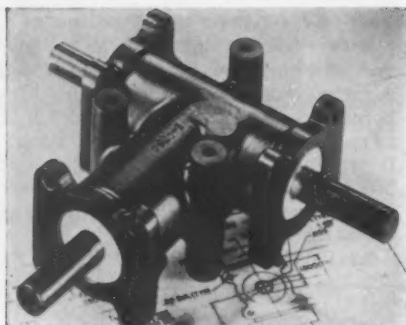
Write NOW for descriptive folder and prices.

25" top Extension .....\$36.00

25" table Extension .....\$34.00

Distributors' inquiries INVITED





340) or 3-way (Model R-350) transmission styles; for use in either power transmission or for manually operated assemblies. Coniflex bevel gear teeth utilize the principle of localized bearing and maintenance of broad contact. This gives self-adjusting feature which is claimed to distribute the load safely to allow greater design margins.

Use ACTION Card, opposite page 64. Encircle No. 73

### THE VISE WITH A THOUSAND GRIPS



**'FLEXIBLE JAWS'** grip all shapes. Grips secure and positive for precise milling, drilling and cutting operations. Eliminate the time and expense of blocking and shimming irregular pieces for toolroom machining. Applicable on any machine tool. Try it in your shop. Save time and dollars on small production runs.

Western Industrial Exposition and  
Convention—March 14-18  
Garrett Supply Company Booth

WRITE FOR INFORMATION TODAY!



AMERICAN POSITIVE GRIP VISE CORP.

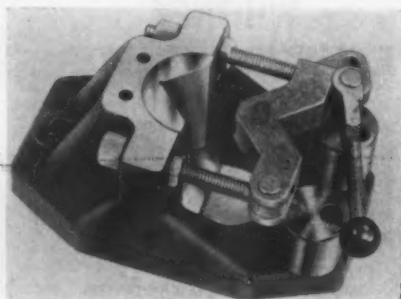
2-B Olive Street  
Williamansett, Mass.

### Multipurpose work holder

Multipurpose work holder by Lassy Tool Co., 108 Bohemia St., Plainville, Conn., has standard interchangeable jaws and clamps for holding single or multiple pieces, hold odd shapes as well as regular.

The base has a through hole to accommodate long work and is provided with a work stop bar recessed into the base.

Use ACTION Card, opposite page 64. Encircle No. 74



TAMMS

## Blue Layout Dope

won't chip, crack or  
flake off!

*Drys fast! Oil resistant!  
Best dope you ever used!*

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SAMPLE!

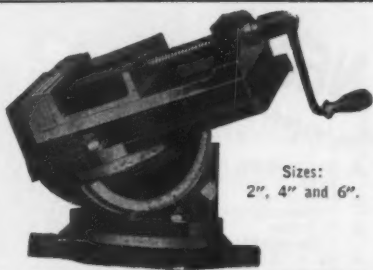
**Tamms Industries, Inc.**  
228 N. La Salle St. • Chicago, Ill.

## TOOLMAKERS! NOW SET-UP FASTER - -

Save time on intricate, angular set-ups with the fully universal MASTER MULTI-SWIVEL VISE. Three swivels instantly set any compound angle. Used worldwide. Interchangeable platens optional. Write for Circular

**DONOVAN MFG. CO.**

82A Batterymarch St. Boston 10, Mass.



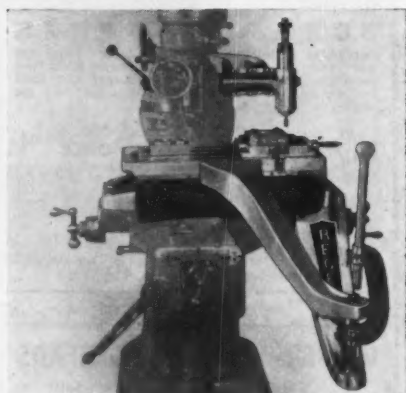
Sizes:  
2", 4" and 6".

### Duplicator table for plastic, glass, rubber molds

Time-saving and exact duplication of molds, dies and production parts is the claim of the new Regent duplicator table for Bridgeport and Index millers.

Especially intended for duplication of plastic, glass, and rubber molds, the table features an effortless fluid motion to insure accuracy. Mounted and removed easily, the tool gives full scale duplication of any shape, two or three dimensional, with a capacity up to 6" x 6". Built-in micrometers contribute to fast setup.

Measuring 32" x 15" over-all at the base and 6½" in height, the table is capable of duplicating parts with one setting. The operator may move it laterally in any direction, milling out the part as a stylus follows the contour of the master mold, die or punch. Lateral motion is controlled by a single lever at the right of the operator. Depth of cut is controlled by raising and lowering both



milling cutter and stylus simultaneously, again following contour of master. Cross and long travels of table can be locked enabling miller to be used for conventional use without removing table. J. M. Kalins & Co., 113 E. Washington Ave., Bridgeport, Conn.

Use ACTION Card, opposite page 64. Encircle No. 75

SPECIMEN

With DYKEM Steel Blue      Without DYKEM Steel Blue

## DYKEM

## STEEL BLUE

### Stops Losses

making Dies and Templates

Popular package 8-oz. can fitted with Bakelite cap holding soft-hair brush for applying right at bench; metal surface ready for layout in a few minutes. The dark blue background makes the scribed lines show up in sharp relief, prevents metal glare. Increases efficiency and accuracy.

Write for sample on company letterhead  
**THE DYKEM COMPANY**  
2301G North 11th St. • St. Louis 6, Mo.

# NEW!

- ★ Heavy Duty Type
- ★ Jam-proof, Automatic
- ★ Portable
- ★ Lightweight
- ★ Up to .050 Stock Capacity

**Birtwell**

## SCRAP CHOPPER

Suspended to "float" freely . . . cannot cause any bow (back pressure) on outgoing waste stock from your press. Replaceable cutters. Light (50 lbs.) and compact, here is a portable unit that will get plenty of use in your shop!

FREE BULLETIN . . . full information, prices. Write today! (Dealers: write for discounts.)

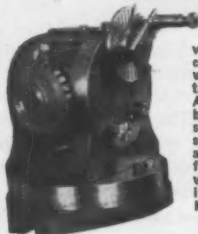
**NORTHEASTERN**  
Development Engineers,  
Inc.

21 High Street  
Pawtucket 5, R.I.



ONLY  
**\$149.50**  
Complete

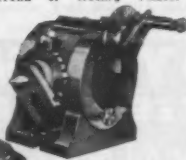
## UNIVERSAL DIVIDING HEADS



Precision built to meet every requirement, Carroll Dividing Heads are the accepted standard in metal-working plants from coast to coast.

A unique optional swivel base makes possible speedy and accurate work settings to compound angles. This and other features convert a conventional Dividing Head into a Universal Work Head or Rotary Table.

Write for 8 page catalog giving complete details, etc.



10" - 12" Universal  
Right or Left Hand  
Dividing Heads with or without Direct Indexing.

**CARROLL DIVIDING HEAD CO.**

3525 Cardiff Ave. • Cincinnati 9, Ohio



Hinged Hammer Moulds

1, 2½ and 5 lb. sizes—order your alloy lead hammer requirements from your machine tool supply house

or direct from:

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# How flat

should YOUR

## SURFACE PLATES

be?

This informative, FREE BOOKLET will help you to:

1. Determine your particular needs.
2. Buy no more accuracy than you require.
3. Get the full amount of accuracy you specify and pay for.



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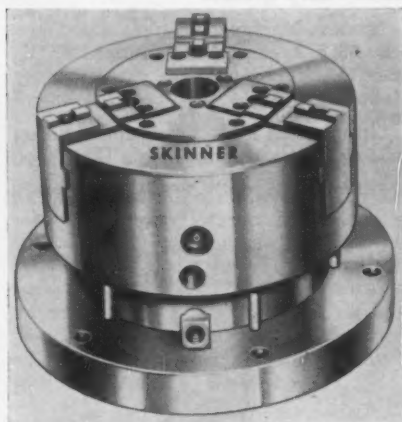
**RAHN** GRANITE SURFACE PLATE CO.

639 North Western Ave., Dayton 7, Ohio

## Power chuck fixture has wedge action

A compact power chuck fixture is non-rotating, air-operated, can be used on drilling, milling and transfer machines, and for assembly operations. It is self-centering and has increased gripping power due to its wedge action.

The angle of the operating wedge prevents the chuck from releasing the work, even though air line is broken. Unit can be disconnected from the air line and transferred to another machine



for a different type of operation or different type of machining on the work.

Available in 8", 10" or 12" diameter, with two or three jaws. Adjustable jaws can be furnished for holding irregularly shaped parts. Maximum air pressure is 100 lb. Skinner Chuck Co., Dept. BB, 95 Edgewood Ave., New Britain, Conn.

Use ACTION Card, opposite page 64. Encircle No. 62

## Adaptable cross-slide tool post

An adaptable cross-slide tool post, the Adapttool-post, which enables the user to employ smaller circular form tools on large automatic screw machines has been developed by the

## MANHATTAN'S MIRACLES! GOVERNMENT SURPLUS

### Set of #1 to #5 Morse Taper CARBON STEEL HAND FINISHING REAMERS

ALL  
NEW

5 to set in wooden case

SAVE  
80%

Regular Price \$46.85  
**OUR low price**  
**only \$7.50**  
Limited quantity!

Tremendous savings on  
all new cutting tools.  
Send us your inquiries  
and write for circular  
listing sensational bar-  
gains!

### MANHATTAN SUPPLY COMPANY

The Cutting Tool Discount House

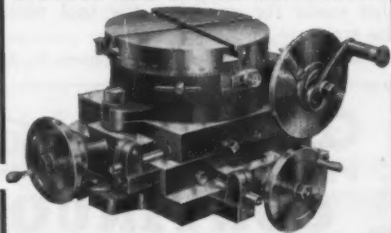
151 R. GRAND ST., NEW YORK 13, N.Y.

Telephone: CAnal 6-4992

## The STEVENS Line

SINCE 1925

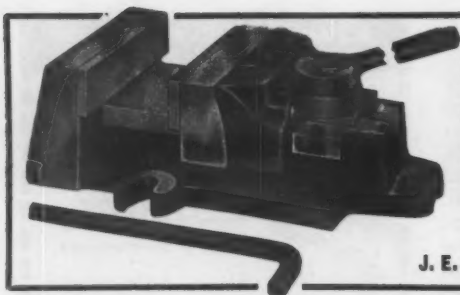
Showing 7½" Dial Type Rotary  
Table mounted on compound  
table No. 1  
Traverse and Circular Movements-



Made in larger size 12" dial type Rotary-  
compound table No. 2. Either unit usable  
separately. Five sizes of Rotary Tables.  
Adjustable tilting tables. Multiple spindle  
index centers. Screw head slotters. Vises

Write for Bulletins

**The JOHN B. STEVENS Company**  
SOMERSVILLE, CONN.



### Plunket Quick Action Vise for DRILL PRESS or MILLING MACHINE

Designed for production work, using an eccentric motion to apply pressure to jaws. Eccentric motion moves jaws 5/16".

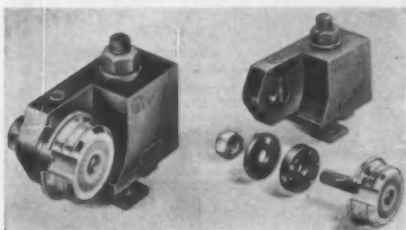
Size No. 7 Net Price  
6" Jaws, 1 1/2" deep, opens 4" ...\$83.16  
Pressure between jaws, with handle  
furnished, 2200 lbs. Net weight 36 lbs.

Our complete line includes Vises for Drill  
Presses, Milling Machines, Shapers, Grinders

**WRITE FOR CATALOG**

**J. E. Plunket Machine Co.**

3230-32 Archer Ave.  
Chicago 8, Ill.



### Heavy duty grinder

Masters Machinery Supply Co., Dept.  
BB, 3613 Archer Ave., Chicago 9, Ill.,  
has introduced a new heavy duty  
Arboga grinder.

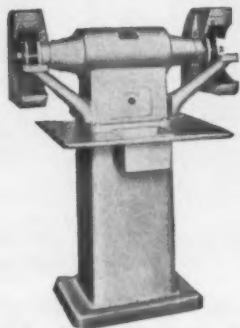
Grinder has 2 hp motor and a heavy  
cast base. It accommodates a 12" wheel.

Use ACTION Card, opposite page 64. Encircle No. 76

American Cam Co., Dept. BB, Hartford,  
Conn.

Fixture is designed to eliminate the  
conventional hook clamp which holds  
the form tool. Pin holes are not required  
since a special adapter ring is provided.  
The special screw adjustment provides  
positive and accurate setting of the cut-  
ting edge, while at the same time per-  
mitting greater clearance. Provision is  
also made for squaring the tool with  
the work.

Use ACTION Card, opposite page 64. Encircle No. 63



CLOSED

TRADE

CLOSED

MARK

Plain Type

Offset Type

## CONTINUOUS HINGES

All hinges shown can be  
furnished with special  
holes, cutouts and bends  
to blue-print in metals  
to suit the job.

THREE-FOURTHS  
OFFSET

**AUTO MOULDING  
& MFG. CO.**

**1110 E. 87TH ST.  
CHICAGO 19, ILL.**

**SPECIFICATIONS:**  
Open width 7/8" to 6"  
Gage Material .040 to .125  
Pin Diameter .101 to 1/8"  
Lengths to 120"

SEMI-OFFSET

**So many standard styles . . . one must be just right for you!**



For 66 years we have been producing metal-working tools and adding to our standard line. Today we have PUNCHES and DIES in a large range of round, flat, oval, and square sizes to fit most makes of punch presses immediately available from stock at regular low, standard prices.

Send for our complete catalog sheets.

**T. H. LEWTHWAITE MACHINE CO.**

312 East 47th St., New York 17, N. Y.

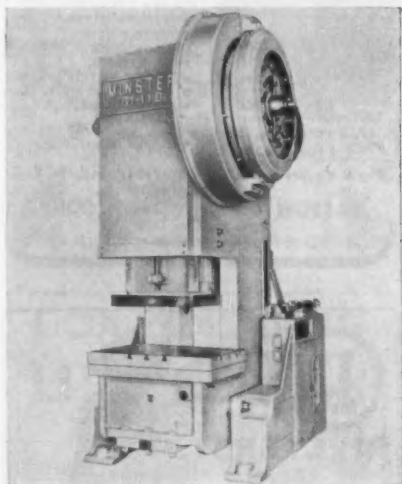
**Press introduces new "C" frame design**

A group of smooth-lined, fabricated steel gap presses, the G1-110 ton, have been introduced by the Minster Machine Co., 250 West St., Minster, Ohio.

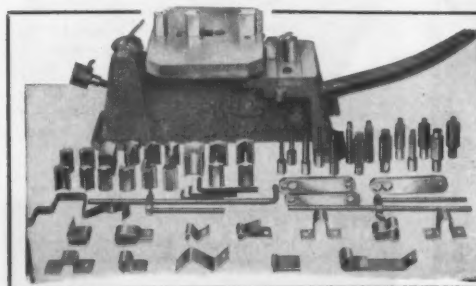
Single entrance connections for air and power permit quick connection for immediate operation or disconnection for relocation at another point in the plant. Adjustable-in-motion rotary limit switch is directly driven through mitered gears. This unit is recommended for synchronizing automation equipment. It is rotor type with three or more circuits as desired.

Presses may be fixed base or inclining base. The inclining base type is arranged for inclining to three fixed positions from vertical to 30° and can be equipped with manual, air powered or motorized inclining attachments.

The massiveness of the steel frame



sections is claimed to increase compressive strength for minimum deflection in steel "C" frame construction and



**Multiform BENDER-CUTTER**

**CUTS, BENDS, PUNCHES**

Available in hand or air operated models, the MULTIFORM is shipped complete with full assortment of dies and mandrels to punch, bend and cut round or flat brass, bronze, aluminum, steel, etc., up to  $\frac{1}{2}$ " x  $1\frac{1}{2}$ " as illustrated, other models up to  $\frac{3}{4}$ " x 4".

**J. A. RICHARDS CO.**  
KALAMAZOO, MICH.



Sensational new  
VIBRA-FORGE<sup>®</sup> principle assures  
unbreakable welds every time!

**BREN WELD**

PORTABLE BAND SAW BLADE  
**WELDER**

... With Built-in Grinder

3/4" capacity



If you've been troubled  
with band saw blade  
breakage investigate this  
Bren/Weld unit built on  
the new Vibra-Forge prin-  
ciple. It gives you:

- PERFECT WELDS.
- NO BREAKAGE.
- NO FAILURES.
- WEIGHS ONLY 35 LBS.
- OPERATES ON 110 V. AC.
- UNCONDITIONALLY  
GUARANTEED.

LIST  
\$169.50  
PRICE

Write today for  
complete details

\*Pat. appl'd for

Mfg'd by Brennan, Bucci & Weber, Inc., N.Y.C.

SALES DIVISION

**KASSON DIE & MOTOR CORP.**

Integrity Since 1919

32-14 Northern Blvd., Long Island City 1, N.Y.

## ENGRAVING MACHINES FLOOR and BENCH MODELS

FOR 2 and 3 DIMENSIONAL  
ENGRAVING

Highly efficient pro-  
cession machines for  
engraving steel, other  
metals and plastics.

You're always safe  
in buying PREIS-  
\*PANTO Engraving  
Machines and Acces-  
sories.



TRADE MARK



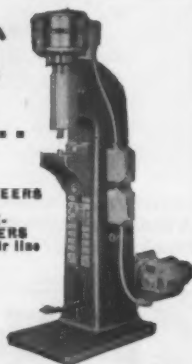
Write for catalog  
and prices.

**H. P. PREIS ENGRAVING MACHINE CO.**  
647 U.S. Highway 22 Hillside, N. J.

## GRANT RIVETERS..



PIONEERS  
and  
PACE-  
MAKERS  
in their line



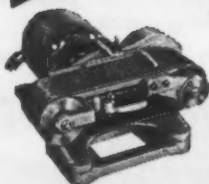
—head rivets from smallest  
to 1/2" diameter either by  
NOISELESS SPINNING or  
VIBRATING HAMMER  
method—sizes to meet all  
needs—types include Ver-  
tical and Horizontal Multi-  
ple Spindles.

Write for literature and  
don't forget to send samples

**THE GRANT MFG. & MACHINE CO.**  
CE Station Bridgeport 3 Conn

DOES IT BETTER  
DOES IT FASTER

## SIMPLEX-M ABRASIVE BAND GRINDER



The precision of  
a machine tool  
plus the durability  
of a workhorse.  
Complete with 1/2  
H.P. Heavy Duty  
Motor and auto-  
matic band tension control. Nothing like  
it for finishing metals, plastics, wood,  
fibre, etc.

OTHER STYLES AND SIZES IN NEW  
MANUAL ON FINISHING—WRITE TODAY

**WALLS SALES CORP.**

333 Nassau Avenue, Brooklyn 22, N.Y.

builds up vibration dampening qualities. Crankshafts are machined, ground and roll burnished for fine, tough surface. Main bearing housings are supported from all angles with heavy steel plate, located and welded to distribute pressure evenly to crown section and prevent shaft deflection. Bearings are nickel bronze bushed, honed and pre-loaded. Gears and pinions are enclosed and running in oil.

Slides have box type cast construction designed to eliminate way deflection. Rear ways are 90°, front 45°. Flanged sides are standard. Slide face has punch shank clearance hole and 3/4" T-slots running f. to b. on 6" centers starting 6" from centerline.

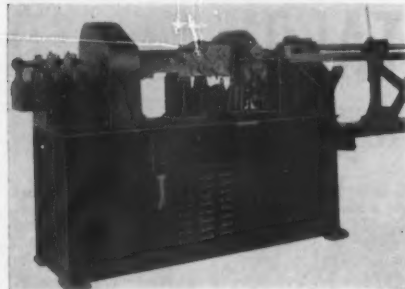
Specifications for 110 ton presses: standard slide stroke of 5" with 80 or 105 strokes per minute on flywheel press or 37 strokes per minute on geared press; bed area 27 x 42; slide area 21 x 28.

Use ACTION Card, opposite page 64. Encircle No. 77

### Machine straightens and cuts square and rectangular wire

Square or hex wire, 3/16" to 1/4", or flat wire 1/16" x 1/4" to 3/32" x 1/2" are straightened and cut automatically on the Model 2ABF straightening equipment manufactured by Mettler Machine Tool, Inc., Dept. MTB, 152 Temple Street, New Haven, Conn. Multiple sets of straightening and feeding rolls handle the wire for long production runs.

Use ACTION Card, opposite page 64. Encircle No. 78



March, 1955

## ACCURATE—LOW COST SINE BARS & PLATES

### 5" Sine Plate

only  
**\$37.50**

- Guaranteed Accuracy
- Precision Ground
- Hardened Rails
- Double Normalized
- Tapped Holes
- End Plates
- Solid Oak Case Extra
- Immediate Shipment



Sine Plates & Bars

No.	Cent. Dist.	Width	Price	With Oak Case
1605	5"	3"	37.50	43.00
1610	10"	5"	87.50	95.00
1705	5"	10"	21.75	25.25

F O B St. Paul:

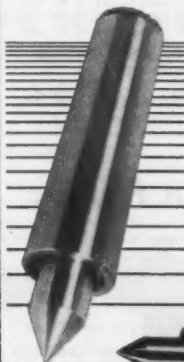
Accurate to .0002" in center distance and parallelism for the length of the tool. Order Today—from your dealer or direct.



**Bald Eagle Tool Co.**

Newton Building, St. Paul 1, Minn.

## COMPENSATING LIVE CENTER



Eliminate "Cold Welding" of your center. Use the accurate, rugged, reliable \*NIROL. The spring loaded Live Center that compensates for expansion and contraction in high speed operations.

Write for complete information.

\*Reg. U.S. Pat. Off.



**\* NIROL MANUFACTURING COMPANY**

900 H'WAY 22, N. PLAINFIELD, N. J.

355

### Cut-off tool has adjustable spring action

Type FN cut-off tools feature adjustable spring action with interchangeable washers which can be arranged for high or low tension. This is claimed to keep the tool from chattering and the work from climbing up on the tool.

By loosening the holding screws the head of the holder can be turned straight or offset, for work close to the chuck. Workpieces of unusual shape may be cut off.

A factor in lessened tool breakage is that the tool actually jumps off the work when overstrained. Cutter blades

are made of hss and are tapered for better side clearance and top rake.

Dimension: size of shank,  $\frac{1}{2}$  x  $1\frac{1}{2}$ " to  $\frac{3}{4}$ " x  $1\frac{1}{2}$ "; size of cutter,  $\frac{1}{8}$ " x  $\frac{3}{4}$ " to  $\frac{3}{16}$ " x  $1$ "; height from bottom of shank to cutter point,  $\frac{3}{16}$ " to  $\frac{3}{16}$ " x  $1$ ". R. B. Tool Co., Inc. Dept. BB, 785 N. Broadway, White Plains, N.Y.

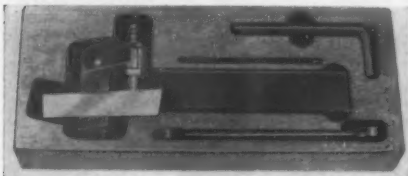
Use ACTION Card, opposite page 64. Encircle No. 79

### Throw-away tool line

Kennametal Inc., 800 Lloyd Ave., Latrobe, Pa., has announced a type of tungsten carbide tooling utilizing throw-away carbide inserts which may be turned over and used on each side prior to disposal.

Tooling is provided in two types: button tools, using a removable chip-breaker, and a heavy duty line in which a hardened clamp serves as a chip deflector.

Button tools with square or triangular





**Increase your drilling output with SELLEY adjustable drill heads**

**in Stock**

No. 0-S (2 spin.)—drill cap  $\frac{1}{8}$ "

No. 0-AD (3 spin.)—drill cap.  $\frac{1}{8}$ "

No. 0-D (3 spin.)—drill cap.  $\frac{1}{8}$ "

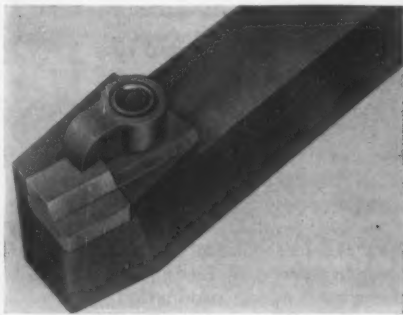
No. 1-D (3 spin.)—No. 1 M. tap.


No. 2-D (3 spin.)—No. 2 M. tap.

No. 3-D (3 spin.)—No. 3 M. tap.

**Send us your drilling requirements.**

**Selley Machine Tool Co.**  
**PAWTUCKET, R. I.**





**precision PLUS..**

# ETALON No. 10

Invest in lifetime accuracy with this **HARDENED STAINLESS STEEL** super caliper. Wide, hand-fitted Vernier slide is smooth operating, easy to read. English or English & Metric graduations. Sizes from 7" thru 20" measuring capacity. In rich wood contour case.

Ask your dealer, or write

**ALINA CORPORATION • 401 Broadway, New York 13, N.Y.**

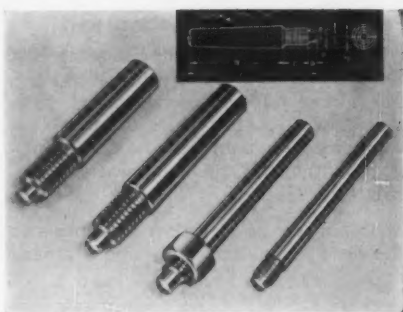
tungsten carbide buttons are available in two finishes: regular, which are molded to size with the nose radii and top and bottom surfaces ground, and precision, which are ground all over for on-the-job indexing.

Heavy duty tools are furnished with rectangular carbide inserts having a 15-degree lead angle and parallelogram-shaped carbide inserts for cutting to a shoulder. Inserts are ground to index within plus or minus 0.005-inch.

Use ACTION Card, opposite page 64. Encircle No. 80

### Threaded taper pin for aligning and doweling

John Gillen Co., 2548 S. 50th Ave., Cicero, Ill., has announced a threaded end taper pin. Threads have been added to the conventional Gillen taper pin to provide more versatility. This new feature permits use as an accurate locating or aligning pin, or for mounting units which require occasional removal or re-



placement.

The pin can be quickly and securely inserted into a blind tapered hole. Threads fit standard size nuts, and by turning the nut, or by leverage, jacking action can be applied to remove the pin from the blind hole. Pins can be furnished in any length or diameter, tapered  $\frac{1}{4}$ " to the foot, in various metals, turned or centerless ground finishes.

Use ACTION Card, opposite page 64. Encircle No. 81

Over 85% of the torque wrenches used in industry are

## STURTEVANT TORQUE WRENCHES

Read by Sight, Sound or Feel

- Permanently Accurate
- Practically Indestructible
- Faster—Easier to use
- Automatic Release
- All Capacities

in inch grams  
...inch ounces  
...inch pounds  
...foot pounds

Every manufacturer, design and production man should have this valuable data. Sent upon request.

PA. **STURTEVANT CO.**  
ADDISON QUALITY ILLINOIS

### Save your large JIG BORERS for large jobs . . . put small precision work on the LINLEY

The Linley Jig Borer provides the means . . . at very low cost . . . of handling your most exacting requirements in precision. With it you can cut costs through having a tool exactly fitted to your small work . . . save your larger machines for larger work.



#### SPECIFICATIONS

Table Movement: 6"x10" Table Size: 7"x17 $\frac{1}{2}$ "

Send for complete information TODAY!

**LINLEY BROTHERS CO.**  
663 State St. Ext. Bridgeport 1, Conn.

### Portable induction heating unit

Lepel High Frequency Laboratories, Dept. B, 55th & 37th Ave., Woodside, N.Y., have developed a compact, self-contained high frequency heating unit combining an induction heating generator with a refrigerating water recirculator.

It can be easily moved, eliminates the need for water supply and drainage



### Powered by the press ram... independent of the die

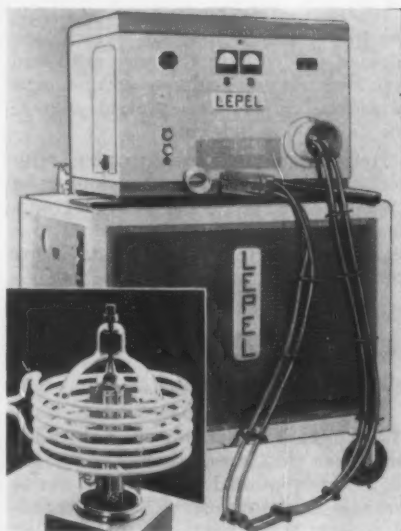
1. **CHOPS** steel up to 3" wide,  $\frac{1}{4}$ " thick.
2. **FITS** any punch press... easy to install.
3. **CUTS DOWNTIME**... high speed steel blades installed in a moment.
4. **SAVES HANDLING SCRAP**... scrap falls into collection barrel.
5. **SAVES MONEY**... low purchase price, no operating cost.

**JACO**

Write today for full details

**DEVICES, INC.**

99 HIGH STREET • HINGHAM, MASS.



connections. Once filled, there is no water consumption at all since the water in the unit is constantly refrigerated and recirculated.

The high frequency generator is designed to permit the use of long flexible leads between the unit and the work coil. Unit also can be used for soldering, brazing and heat treating ferrous and non-ferrous metals; operates on 110 or 220 volts, single phase and contains a stepless Thyatron power control.

Use ACTION Card, opposite page 64. Encircle No. 83



### THE CRALEY OFFSET BORING HEADS

- Note depth of bearing.
- Tool carrying block most accurately fitted of any boring head made.
- Large graduated dial screw — easily read calibrations.
- Note minimized overhang.
- Tension screws on opposite sides and ends of block — all cutting strain thrown against solid metal.
- Nine sizes.
- 20 years of Craley experience specializing in boring heads.

**C. C. CRALEY MFG. CO.**

100 MONTROSE BLVD. SHILLINGTON, PENNSYLVANIA

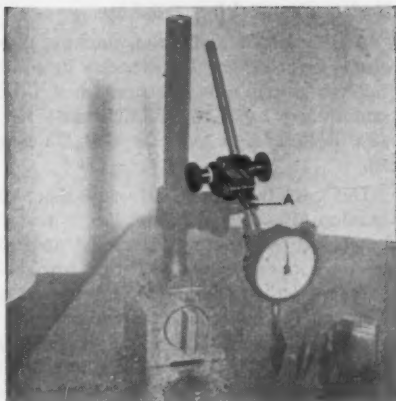


### Fine-adjustment sliding swivel gives smooth, precise indicator setting

Smooth, positive positioning of dial gages graduated in ten-thousandths is claimed with Rocheleau's newly developed fine-adjustment sliding swivel, without tapping or otherwise jarring the indicator rod.

This rigid, patented device has a separate clamp for each rod ( $5/16"$  or  $3/8"$  sizes), by which approximate setting of the indicator is quickly completed. Final, precise positioning is then smoothly and accurately made by slight movement of the convenient lever "A." Only a simple dial holding rod is required, as all adjusting is done with the device itself.

Applications cover a wide variety of inspection, toolmaking, and general machining operations. As a complete unit, it may be attached to any indicator base now on the market, or the fine-adjustment mechanism may be used on



boring, milling, shaping, or planing machines or fixtures requiring a dial indicator. L. A. Rocheleau Tool & Die Co., Dept. BB, 651 North Main St., Leominster, Mass.

Use ACTION Card, opposite page 64. Encircle No. 82

### to be exact specify

**Abart**  
SPEED REDUCERS

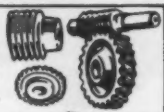


#### SPEED REDUCERS

75 different models...spur, worm and combinations. Ratings from 1/50 to 168 hp... ratios up to 10,000 to 1.

#### GEARS

No stocks. Custom-cut to specs from any metal or non-metal gear material. 96 Pitch to 4 D.P.— $1/4"$  P.D. to 18" P.D.



#### CATALOG

Handy illustrated pocket-size. Packed with diagrams, technical data and tables. Free on request...write today.



**Abart** GEAR & MACHINE CO.

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### DEVCON

The Plastic Steel  
For making  
Tools, Jigs,  
Fixtures and  
repairing  
machinery

BULLETIN ON  
REQUEST

CHEMICAL  
DEVELOPMENT  
CORPORATION  
Box 2  
Danvers, Mass.



## Hydraulic marking machine

An improved hydraulic marking machine, offering greater capacity in addition to other new features, has been announced by Geo. T. Schmidt, Inc., 1802 Belle Plaine Ave., Dept. B, Chicago 13.

Designated as Model 375, it is a senior version of standard Model 175, but with increased throat dimension and greater distance between the machine uprights to permit the marking of larger parts. The machine employs knurls or knurl typeholders with interchangeable type for marking flats, and straight dies, typeholders, and combination dies for rounds. Numbering operations can also be performed using numbering heads.

Unit is equipped with a double acting table cylinder which returns table to down position hydraulically without the use of springs. The frame is claimed



to eliminate vibration and spring at maximum pressures up to 12,000 lb.

An improved hand wheel control for

## CONVERTIBLE BUILT-UP SNAP GAGE



**A NEW IDEA to cut gage labor costs**  
Now your gage makers can save time by eliminating all labor except the grinding of the spacer block . . . with resulting savings to you. Low in cost, these units will pay for themselves many, many times in your plant. Supplied with high speed steel anvils, hardened and ground.

Size A	0—.187 Inc.	\$3.32
Size B	.187—.531 Inc.	\$3.92
Size C	.531—1.093 Inc.	\$5.60
Size D	1.093—1.968 Inc.	\$6.48

Price based on order of six or more. Other quotations on request. Write for full details. Patent Pending

**MECHANICAL PRODUCTS CO.**  
30 MANHAN ST., WATERBURY, CONN.

## HAND TAPPING with MACHINE PRECISION

Adapts for  
LATHE  
USE

**59<sup>50</sup>**

F. O. B.  
FACTORY



Just slip a tap adapter into the Dahlstrom Tap Guide and twist. Your hand tapping will be quick and accurate. For machine tapping, the spindle top is center-bored to fit the tailstock center of a lathe. Size 19" x 8" x 14". Includes 9 adapters (8-32 to 3/4"). Taps not furnished. Branch Mfg. Co., 12 Olson Drive, North Branch, Minn.

WRITE FOR PAMPHLET.

**Dahlstrom TAP GUIDE**

table has a positive lock, once the table is positioned, to prevent crawling. The pump is equipped with a removable cartridge for easy change of the range of the machine's pressure.

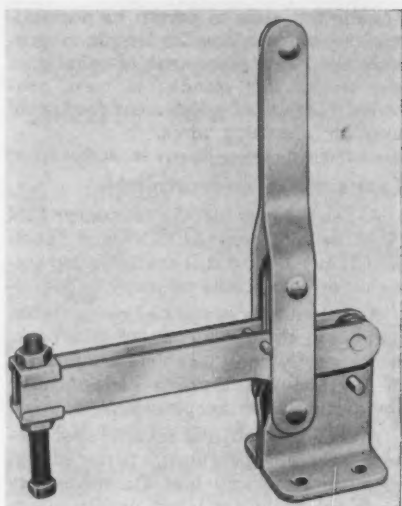
Marking capacity in steel: 3 lines of  $\frac{1}{4}$ " characters; 4 lines of  $\frac{3}{16}$ " characters; 5 lines of  $\frac{1}{8}$ " characters; 7 lines of  $\frac{1}{16}$ " characters.

Use ACTION Card, opposite page 64. Encircle No. 84

### **Magnetic attraction, corrosion ended with toggle clamp, pliers**

Magnetic attraction and corrosion have been eliminated by a new type toggle clamp and toggle pliers, according to an announcement made by Lapeer Mfg. Co., Dept. MTB, 3052 Davison Rd., Lapeer, Mich.

The clamps are made from non-magnetic stainless steel, and the portable toggle pliers are forged from non-magnetic K - Monel. Both are available in a wide range of sizes and types.



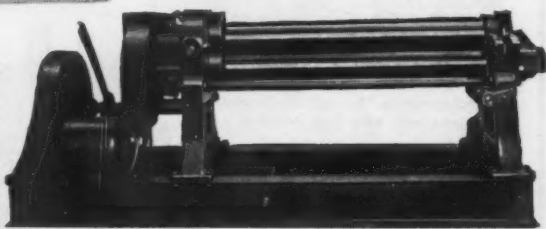
The Knu-Vise Model V-400 toggle clamp has a channel on which the

# Beloit

## INITIAL TYPE BENDING ROLLS

Sheets and plates are quickly formed into cylindrical shapes with this efficient, hard working Beloit Bending Roll. Built for years of trouble-free service. Easy to operate. Rolls are of slip type. Hinged housings permit speedy removal of completed cylinders. Reversing lever places machine in readiness for the next job. Do forming quicker easier and at lower cost with Beloit equipment.

*Beloit Equipment will cost you less and serve you better.*



Picture is one member of the famous Beloit line which also includes Punches, Shears, Rod Cutters, Notchers, Bending and Straightening Rolls.

**Write for  
complete  
details**

**HENDLEY &  
WHITEMORE CO.**  
100 Blackhawk Blvd. Beloit, Wis.

spindle can slide to permit its positioning anywhere along its length to provide the exact placement of spindle on the work. The spindle, in turn, provides the desired adjustment for height and for clamping force.

Use ACTION Card, opposite page 64. Encircle No. 85

### Copies of jet issue available

A few copies of the January 1954 "Jet" issue of the MACHINE and TOOL BLUE BOOK are still available for distribution at 50 cents per copy.

A tremendous amount of research has gone into the production of this book, making it the most complete compilation of jet material ever to be published by a metalworking periodical.

Among the subjects covered are: history, types, operations, parts of jet engines; American and European aircraft gas turbines; latest developments of carbide machining of heat and corrosion resistant metals; machining the aviation gas turbine high temperature

alloys; ceramic coating of jet engine hot parts; mass production methods of manufacturing hot parts. Write: MACHINE and TOOL BLUE BOOK, Wheaton, Ill.

Use ACTION Card, opposite page 64. Encircle No. 86

### Bench model wire straightener

Mettler Machine Tool, Inc., Dept. MTB, 152 Temple St., New Haven, Conn., has announced a self-feeding, rotary straightener measuring only 16" for its longest dimension.

A choice of arbors mounted in ball bearings each with five straightening dies is available, one for wire in the .020 to .040 range and the other in the .025 to .062 range; ½ hp motor. Units can be supplied geared to feed 30, 60, or 90 fpm.

Use ACTION Card, opposite page 64. Encircle No. 97

### Two new clamp models

Two more new clamp models have been announced by the Detroit Stamp-

## FOR YOUR POWER PRESS

**HIGH PRODUCTION:** In your power press the VOGEL TUBE SHEAR cuts any diameter or wall thickness of tubing within range of machine from 1/3 to 1 second per cut.

**MINIMUM BURR:** Cuts square ends with minimum of burr.

**LOW MAINTENANCE:** Simplicity of design with few moving parts insures low maintenance. "Set-up" can be done by anyone with very little training.

**INTERCHANGEABLE:** Die blocks available to cut tubing sizes from 1/8" O.D. to 2" O.D.

**AUTOMATIC STOP:** Holds lengths to plus or minus .010" cut from any mill lengths of tubing.

PATENTED

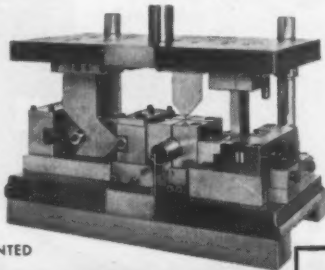
## THE VOGEL TUBE CUT-OFF MACHINE

### No. 12 VOGEL CUT-OFF MACHINE

Takes tubing up to 1/2" O.D. x 3/32" wall.

### No. 2 VOGEL CUT-OFF MACHINE

Takes tubing up to 2" O.D. x 1/8" wall.



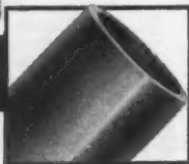
SEND FOR  
SAMPLE  
CUTS AND  
DESCRIPTIVE  
LITERATURE

# VOGEL TOOL AND DIE CORPORATION

1825 N. 32nd Ave.

Melrose Park, Illinois

Fillmore 5-0160

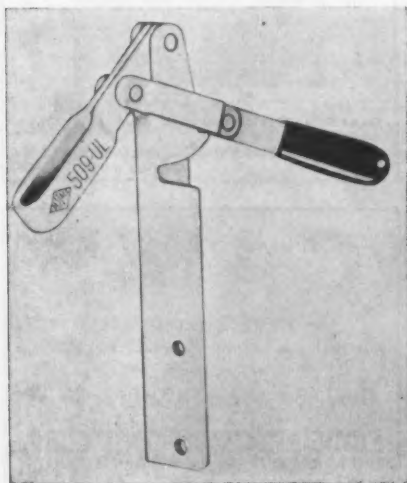




ing Co., 347 Midland Ave., Detroit.

Designated as 509-U and 509-S, they also feature low silhouette, complete clearance of working area, flop-over action and safety-ease handle grip.

The 509 Series has angular-flange base which permits easy mounting by bolts or welding to side of fixture. When mounted vertically to side of fixture,



For Arbor Spacers and Shims,  
Feeler Stock or Shim Stock...

**specify top-quality**



#### ARBOR SPACERS AND SHIMS

20 arbor sizes  $\frac{3}{8}$ "  
to 4" ... 19 thick-  
nesses .001" to .125"

Specify with or without keyways. Also available—hardened and ground spacing collars (with standard keyway)  $\frac{1}{8}$ " to 3" long in all popular sizes. (For use in milling, slitting and gang-saw setups, shimming gears and bearings.)

#### FEELER STOCK

Made from tempered stock, rolled to close tolerances.

$\frac{1}{8}$ " x 25' coils packaged in transparent plastic boxes, except above .020". Strips  $\frac{1}{8}$ " x 12", in cellophane. 27 thicknesses. All thicknesses from .001" to .032". (For use in precision fitting, checking clearances, inspection and production work.)



#### SHIM STOCK

Selected from material rolled to precision limits, free from burrs, and protected by oil coating. Coils packed in carton for easy dispensing and protection. 15 thicknesses .001" to .032". Sheets 6" x 12"; coils 6" x 120". Available also in assortment package of 12 thicknesses .001" to .015".

For details and prices,  
write for descriptive literature.



**Detroit Stamping Co.**

347 MIDLAND AVE. • DETROIT 3, MICH.



The simplified PYRO Optical is the ideal instrument for direct temperature readings of ANY heated object in your plant. Completely SELF-CONTAINED, PORTABLE, RUGGED, LIGHT WEIGHT (3½ lbs.) and FOOLPROOF. No correction charts, no accessories and no maintenance expenses. Unique design permits temperature determination even on MINUTE SPOTS. Fast MOVING OBJECTS and of the SMALLEST STREAMS.

Write for Catalog No. 80  
THE PYROMETER INSTRUMENT CO.  
New Plant and Laboratory, Bergenfield 3, N. J.



## NEW NESTING TYPE TOTE PANS

Sturdy 16 ga. metal.  
20" long x 12" wide  
x 6¼" deep. Drag  
holes and handles at  
both ends.

J. L. LUCAS & SON, INC.  
Bridgeport 5, Conn.

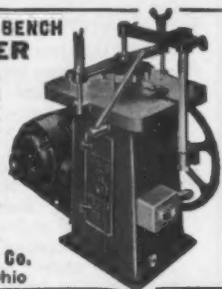
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Portable — move  
directly to job; a  
time saver for  
both small and  
large shops.

¾" stroke;  
adaptable for  
other work.

Low first cost—  
prompt delivery.  
Good dealers wanted.

Reading Machine Co.  
Cincinnati 37, Ohio



**CUT  
TOOL  
COSTS**

broken tools  
made like new again  
with **NU-TANGS**

Twisted or broken tangs replaced at low  
costs on any tool with a Morse Taper (sizes 1 to 6)  
Hundreds of leading industries save money on drills,  
reamers, countersinks, cutters, drivers, the NU-TANG way.  
Prompt delivery. Send for prices—or send tools for repair.  
All work guaranteed.

**NO WELDING!**  
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STRONG AS NEW!**

We return them  
like this!

Send them to  
us like this!

Patent No.  
2,512,034

**NU-TANGS** INC. 1331 Bates Avenue  
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## STANDARDIZED

## Micro Drill Guides

All standard body styles available  
with hole sizes from .80 to 3/32".  
Tolerances of .0002 maintained on  
I.D., O.D., and concentricity.

**MICRO  
DRILL  
GUIDE**



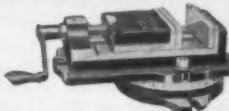
3980  
Superior Ave.  
Cincinnati 36,  
Ohio

**LW**

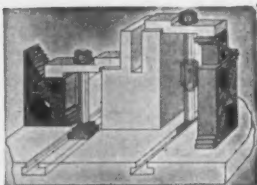
## SWIVEL BASE MILLING MACHINES VISES

AS LOW AS  
**\$24.00**

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catalog on  
vises, power  
hack saws, magnetic chucks, dividing heads.



**L-W CHUCK COMPANY**  
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— T T C O —

Sure Grip Step Blocks and Stud Sets Clamp  
Assemblies at low prices.

**TIETZMANN TOOL CORPORATION**  
DEPT. C. T. ENGLEWOOD, OHIO

# CAMS

To Your Specifications  
except Screw Machine Cams

— — — — —

Design Assistance Offered

**KIDDE PRECISION TOOL CORP.**  
37 FARRAND ST. BLOOMFIELD, N. J.

the holding bars flip completely over side of fixture to produce a positive clamping action at a 45° angle directly against upright fixture base.

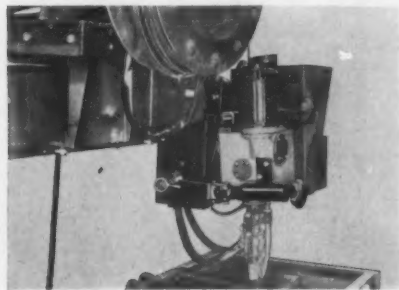
Model 509-U is distinguished by its U-shape holding bar; this model is recommended where welding facilities are not convenient. Model 509-S differs from 509-U in only one major particular—the solid carbon-steel work-holding bar to which a wide variety of spindle assemblies may be attached.

Use ACTION Card, opposite page 64. Encircle No. 87

### **Welding equipment produces beads up to 4" wide in single pass**

The Lincoln Electric Co., 22801 St. Clair Ave., Cleveland, Ohio, has announced automatic welding equipment for producing beads up to 4" wide in a single pass. The equipment, called Spreadarc, is an attachment that mounts on a standard Lincolnweld automatic head and oscillates the head back and forth at right angles to the direction of travel. The amount of oscillation can be controlled to produce a pad of weld metal up to 4" in width in a single pass. It may be used to build up a layer of hardsurfacing metal or to build up with mild steel.

The unit may be installed on heads now in use without any major changes required. It is powered by its own variable speed electric motor which through an eccentric oscillates the entire welding head assembly. The width of the oscil-



## **BERGSTROM**

**CENTER  
LAPPING  
MACHINE BV - 1**

Laps 60° centers quickly, easily and precisely.

Very rugged construction.

Lifetime Ball Bearing Spindle mounted in a spindle body which is vertically operated by a balanced lever.

Four spindle speeds.

Dressing device sideways adjustable.

Diamond carrier lever operated through a friction device. No swing-away necessary.

All bearings sealed against dust.

Scraped ways on machine column.

Standard abrasive sticks and pencil wheels used.



**NEW LOW  
PRICE**

**\$695**

Ask for information about this and other Homstrand precision products.

*Homstrand*  
INC.

9 Addison Street

Larchmont, N. Y.

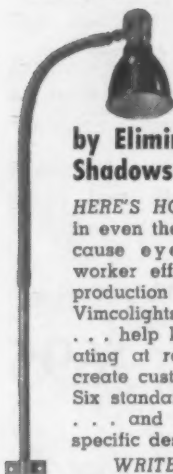
La 2-5550



## DESIGNERS



# VIMCO *Lights*



**INCREASE  
PRODUCTION**

**by Eliminating Fatiguing  
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**HERE'S HOW!** Shadows . . . met in even the most modern plant . . . cause eye strain and decrease worker efficiency. Your machine's production suffers. Errors increase. Vimcolights do away with eye strain . . . help keep your machine operating at rated capacity . . . help create customer satisfaction. Six standard models for every use . . . and "specials" available for specific designers' needs.

WRITE FOR BULLETIN 85

Vimcolights are  listed

**VIMCO MFG. CO., Inc.**

109 Brayton Street

Buffalo 12, N.Y.

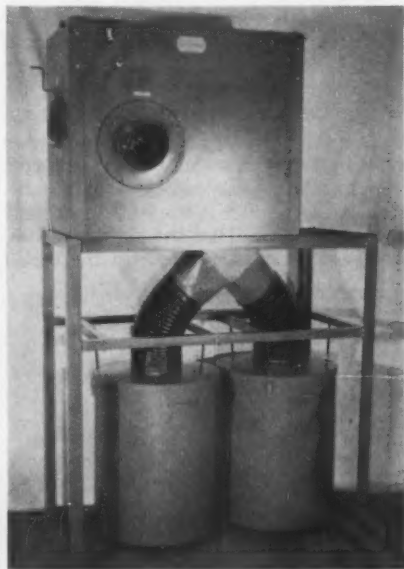
lation is controlled by an adjustment of the eccentric and the number of oscillations per minute by a rheostat control of the motor speed. Speed and width are controlled to meet varying requirements.

Use ACTION Card, opposite page 64. Encircle No. 88

### Dust collecting unit changed

A more efficient and easily maintained dust collecting unit is said to have resulted from several design changes made in Dustkop Model 11w50. The over-all height of the unit has been reduced by approximately 10" by elimination of the standard dust bin, and allows filtered dust, shavings, chips, or lint to drop directly into selected collecting roller cans.

The two roller cans plus the diversion "Y" have also been redesigned to permit greater capacity and ease of maintenance with a cleaner, more airtight system. The all metal, flexible diversion "Y" provides the cans with a better, more permanent seal, permitting



dust to flow more freely and to settle faster, it is claimed.

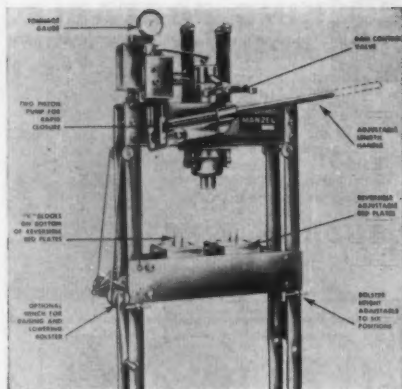
Connecting, disconnecting, and removal of dust roller cans is made easier because of a new lid closing principle. The lid is held in place, during operation, by three clamps. Lid and "Y" connections are self suspending during roller cam removal and dumping operations. Made by Agat Mfg. Co., Dept. BB, Adrian, Mich.

Use ACTION Card, opposite page 64. Encls. No. 89

### Twenty-five ton arbor press

A 25 ton arbor press features an adjustable handle and reversible and adjustable bolster or bed plates with V blocks attached to one side. Bolster can be set at any of six positions by relocating two supporting pins.

A two-piston hydraulic pump closes the ram until the work is engaged when a single piston takes over to perform



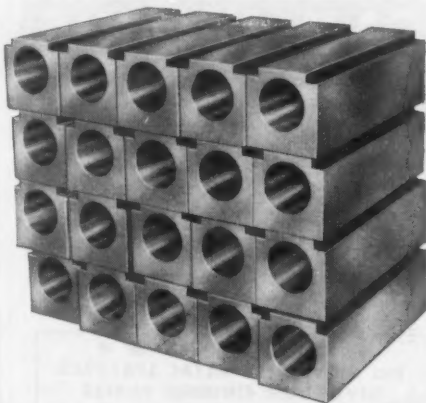
the forcing operation. A safety valve prevents accidentally exceeding the 25 ton pressure for which the press is designed. The Manzel Div. of Frontier Industries, Inc., 315 Babcock St., Buffalo 10, N.Y.

Use ACTION Card, opposite page 64. Encls. No. 90

## Let a Specialist

### Make Your Bored and Honed Parts.

American has recently more than doubled its capacity to manufacture hollow bored and honed parts to 15 inch I.D.—lengths to 27 feet. Heat treating to specified physicals—exact tolerances and honed finishes rigidly maintained. Send drawings for estimates.



MANUFACTURERS OF HYDRAULIC CYLINDERS • SPINDLES • SLEEVES  
CLUTCH SHAFTS • PISTON RODS • RAMS • QUILLS, ETC.

**AMERICAN HOLLOW BORING CO.**

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## KING PORTABLE BRINELL

for all **HARDNESS**  
TESTING. Throat 4",  
Gap 10", WL 27  
lbs. — **ACCURATE**

Puts actual load of  
3000 KG on 10 mm. ball.  
Test head removable for  
testing very large parts.

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## CAM MILLING

Fully equipped modern machine shop  
with extensive **Jig Boring, Surface  
Grinding, Horizontal Boring and  
Thread Grinding** facilities as well as  
modern **Cam Milling and Cam Grinding**  
equipment.

*Your Inquiries Answered Promptly*

**HIMOFF MACHINE CO., INC.**  
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THE WAY THESE METAL SCRAPERS  
GIVE FINER FINISHES FASTER



Forthman scrapers tipped with  
**CARBOLOY** Cemented  
Carbides stay sharp far longer  
than steel scrapers, permit finer  
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per piece. Write for **FREE Folder**.

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**"Jorgensen"**  
NEW U.S. PAT. OFF.

**"C" CLAMPS**

Also bar clamps, hinged  
clamps, spring clamps, etc.

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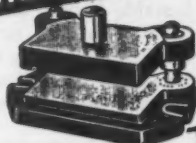
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Precision-Bored  
on Master Plates



**DANNEMAN DIE-SET DIVISION**  
**ACME-DANNEMAN COMPANY, Inc.**  
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ON REQUEST**

**NEW!**



**LASSY**

**Super  
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Hand Tapper**

With exclusive fea-  
tures sets new  
standards for ac-  
curacy, time and  
taps saved. Capacity  
No. 0 to 1/2".  
Free 6 page circ-  
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Plainville, Conn.

## JIG BORING

and

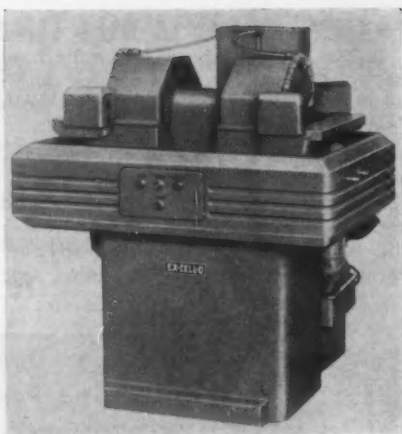
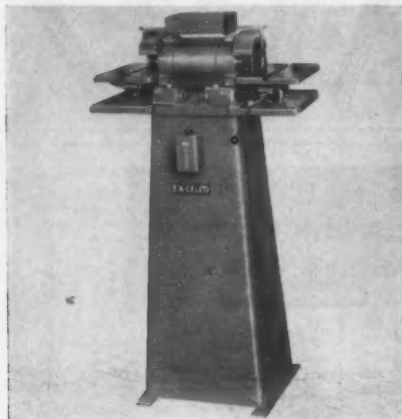
**Large Precision Machining**  
Done to your specifications

**WE HAVE 13 JIG BORERS**

**KIDDE PRECISION TOOL CORP.**  
37 FARRAND ST. BLOOMFIELD, N. J.

## Two new tool grinders

Two new tool grinders, Style 46-D using 6" wheels, and Style 49-D using 14" wheels, have been introduced by Ex-Cell-O Corp., 1212 Oakman Blvd., Detroit. Both are double-end models



with reversible motors, large tool rest tables, and both are claimed to be suitable for sharpening all types of tool materials—high-speed steels, cast alloys and carbides.

Use ACTION Card, opposite page 64. Encircle No. 91

## MAKE SPRINGS in a jiffy!

with

### Blaner Universal Hand SPRING WINDER



Patent No.  
2052443

Write for your  
Circular.

Here's a profitable tool room unit. Quickly makes hundreds of sizes of springs. Sturdy, dependable . . . a real time and money-saver.

No. 3 size winds up to  
1 1/2" O.D.  
Costs only \$36.00

**THE BLANER MANUFACTURING CO.**  
307 MUNROE FALLS AVE.  
CUYAHOGA FALLS, OHIO



A heavy duty small tool for grinding welds, etc. where space is limited.

FREE Spindle Speed 10,000 R.P.M.

Uses 4" abrasive discs or 1/4" chuck with rotary cutters or mounted wheels.

Weight 4 1/4 lbs.

**THE**  
*Nedco*

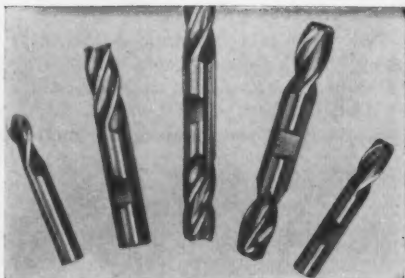
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complete catalog

**COMPANY**  
Waltham 54, Mass.

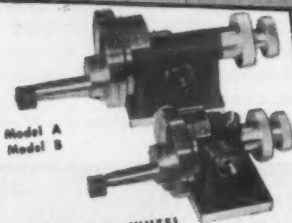
## High speed end mills

A line of high speed end mills has been developed for use on tough alloy steels and abrasive ferrous and non-ferrous materials.

Manufactured by the Metal Removal Co., Dept. B, 1546 N. Orleans, Chicago, under the name of Blackhawk, mills contain 5% vanadium. After heat treating and a triple draw, vanadium carbides are dispersed providing an



## Improve Your Operating Efficiency, Quality and Profits with these LAST WORD Metal-Working Products!



Model A  
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**LAST WORD WHEEL DRESSERS FOR RADIUS AND TANGENT ANGLE DRESSING — AVAILABLE IN 3 MODELS.**  
MODEL A—For grinders using wheels up to 20" dia. MODEL B—For small model surface grinders with 7" max. wheel dia. MODEL C—Compound Dresser, will compensate for compound angles involved in grinding form tools.

Model C



**SAMSON "Heavy-Duty" OFFSET BORING CHUCK**—Has positive centering feature for drilling and milling operations. Complete accessories available.



**GRAY-GRIMES FLOATING DRIVER**—For reaming, tapping, valve seating and similar operations. Can be supplied with standard or special shanks and adaptors.



**GRAY-GRIMES AUTOMATIC STEADY-REST FOR O. D. GRINDING**—Permits grinding complete length of shaft maintaining constant pressure against work-piece as stock is removed.

Mfg'd by  
Gray-Grimes Tool Co.



Send for  
complete  
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## WHY WAIT FOR SPECIAL DRILLS?

... Has them **IN STOCK**  
for **IMMEDIATE DELIVERY!**

### Extra Long Length High Speed Drills—Straight Shank

#### TAPER LENGTH WIRE GAUGE SIZES

Wire Gauge Nos.	Price Each	Length Overall Inches	Approx. Length of Twist Inches	Wire Gauge Nos.	Price Each	Length Overall Inches	Approx. Length of Twist Inches
1	\$1.00	6 1/4	3 3/4	31	.70	5 1/4	3
2	1.00	6 1/4	3 3/4	32	.70	5 1/4	3
3	1.00	6	3 3/4	33	.70	5 1/4	3
4	1.00	6	3 3/4	34	.70	5 1/4	3
5	1.00	6	3 3/4	35	.70	5 1/4	3
6	1.00	6	3 3/4	36	.70	4 3/4	2 1/2
7	1.00	6	3 3/4	37	.70	4 3/4	2 1/2
8	1.00	6	3 3/4	38	.70	4 3/4	2 1/2
9	1.00	6	3 3/4	39	.70	4 3/4	2 1/2
10	1.00	6	3 3/4	40	.70	4 3/4	2 1/2
11	.90	6	3 3/4	41	.60	4 3/4	2 1/2
12	.90	6	3 3/4	42	.60	4 1/4	2 1/2
13	.90	5 3/4	3 1/2	43	.60	4 1/4	2 1/4
14	.90	5 3/4	3 1/2	44	.60	4 1/4	2 1/4
15	.90	5 3/4	3 1/2	45	.60	4 1/4	2 1/4
16	.90	5 3/4	3 1/2	46	.60	4 1/4	2 1/4
17	.90	5 3/4	3 1/2	47	.60	4 1/4	2 1/4
18	.90	5 3/4	3 1/2	48	.60	3 3/4	2
19	.90	5 3/4	3 1/2	49	.60	3 3/4	2
20	.90	5 3/4	3 1/2	50	.60	3 3/4	2
21	.80	5 3/4	3 1/2	51	.50	3 3/4	2
22	.80	5 3/4	3 1/2	52	.50	3 3/4	2
23	.80	5 3/4	3 1/4	53	.50	3	1 3/4
24	.80	5 3/4	3 1/4	54	.50	3	1 3/4
25	.80	5 3/4	3 1/4	55	.50	3	1 3/4
26	.80	5 3/4	3 1/4	56	.50	2 1/4	1 1/4
27	.80	5 3/4	3 1/4	57	.50	2 1/4	1 1/4
28	.80	5 3/4	3 1/4	58	.50	2 1/4	1 1/4
29	.80	5 3/4	3 1/4	59	.50	2 1/4	1 1/4
30	.80	5 3/4	3 1/4	60	.50	2 1/4	1 1/4

S Set \$1—1 ea. \$1-60 Long Drills. Consists of 60 Drills .... \$40.00  
 E Set \$2—1 ea. Letter A-Z Long Drills. Consists of 26 Drills .... 40.00  
 T Set \$4—1 ea. 1/8 to 1/2 Extra Long Drills. 12" Overall,  
 9" Flute. Consists of 25 Drills x 64ths ..... 55.00

#### STRAIGHT SHANK 12" LONG 9" FLUTE

Size Inches	Price Each Net	Size Inches	Price Each Net
1/8	\$1.65	5/16	2.25
9/64	1.65	21/64	2.50
5/32	1.65	11/32	2.50
11/64	1.65	23/64	2.75
3/16	1.65	3/8	2.75
13/64	1.80	25/64	3.05
7/32	1.80	13/32	3.05
15/64	1.95	27/64	3.30
1/4	1.95	7/16	3.30
17/64	2.05	29/64	3.60
9/32	2.05	15/32	3.60
19/64	2.25	31/64	3.60
		1/2	3.60

#### 15" LONG 12" FLUTE

Size	Price Each	Size	Price Each
17/32	\$7.00	21/32	9.00
9/16	7.70	11/16	9.10
19/32	8.25	23/32	9.35
5/8	8.80	3/4	9.50

#### Taper Length Letter Sizes STRAIGHT SHANK

Size	Price Each	Length Overall Inches	Approx. Length of Twist Inches
A-E	\$1.64	6 1/4	4
F-K	1.71	6 1/4	4
L-N	1.78	6 3/4	4 1/4
O-R	1.86	6 1/2	4 1/4
S-U	2.00	6 3/4	4 3/4
V-Y	2.14	7	4 3/4
Z	2.29	7 1/4	4 3/4

#### TAPER SHANK

Size	Price Each	Length Inches	Twist Inches	Shank Size	Size	Price Each	Length Inches	Twist Inches	Shank Size
33/64	\$7.15	17	13	No. 2 M.T.	47/64	\$ 9.50	17	13	No. 2 M.T.
17/32	7.15	17	13	No. 2 M.T.	3/4	9.50	17	13	No. 2 M.T.
35/64	7.70	17	13	No. 2 M.T.	25/32	10.20	17	13	No. 2 M.T.
9/16	7.70	17	13	No. 2 M.T.	13/16	12.00	18	13 3/4	No. 3 M.T.
37/64	8.25	17	13	No. 2 M.T.	27/32	12.50	18	13 3/4	No. 3 M.T.
19/32	8.25	17	13	No. 2 M.T.	7/8	13.20	18	13 3/4	No. 3 M.T.
39/64	8.80	17	13	No. 2 M.T.	29/32	13.75	18	13 3/4	No. 3 M.T.
5/8	8.80	17	13	No. 2 M.T.	15/16	14.30	18	13 3/4	No. 3 M.T.
41/64	9.00	17	13	No. 2 M.T.	31/32	15.40	18	13 3/4	No. 3 M.T.
21/32	9.00	17	13	No. 2 M.T.	1	17.60	20 1/2	15 3/4	No. 3 M.T.
43/64	9.10	17	13	No. 2 M.T.	1-1/16	18.79	20 1/2	15 3/4	No. 3 M.T.
11/16	9.10	17	13	No. 2 M.T.	1-1/8	19.80	21 1/2	15 3/4	No. 4 M.T.
45/64	9.35	17	13	No. 2 M.T.	1-3/16	22.00	21 1/2	15 3/4	No. 4 M.T.
23/32	9.35	17	13	No. 2 M.T.	1-1/4	24.00	21 1/2	15 3/4	No. 4 M.T.

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INVITED

# Sid Tool Co., Inc.

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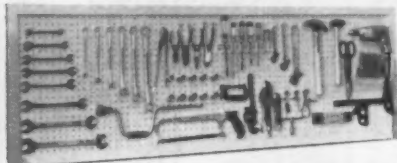




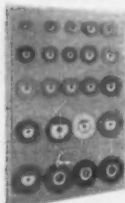
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**TIME  
TOOLS  
MONEY  
FLOOR SPACE**

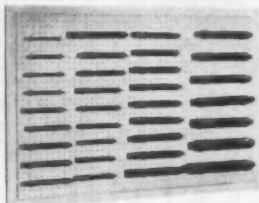
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Use ACTION Card, opposite page 64. Encircle No. 93

## Tilting-arbor band saw

The Darra-James tilting arbor band saw's tilting mechanism is counter-balanced and tilts with the slightest pressure; locks securely at any angle with "T" handle locking screw. Automatic stops are provided at 45° and 90° but may be swung out of play if desired. By tilting the blade while saw is in operation it is easy to make a spiral cut. Blade tension and blade



guides remain in proper adjustment through all angles of tilt and table stays flat. The table rides milled guides which are adjustable for possible wear.

Model No. 512 has a throat of 12" at regular 90° angle of cut and 15" at 45° angle. Cuts material over 9" thick. ToolKraft Corp., Dept. BB, Springfield 1, Mass.

Use ACTION Card, opposite page 64. Encircle No. 95

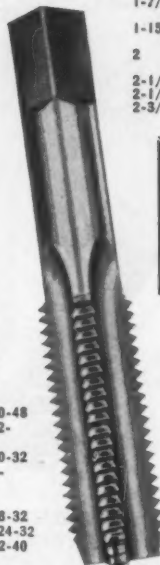
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### SIZE THREAD

4	32-48-60-64
5	30-32-36-48-80
6	36-40-48-56-60
7	32-40-48
8	24-30-36-38
	40-44-48
9	24-28-32-40-48
10	28-30-36-40-48-64
12	20-28-32-36-48
14	20-24-28
1/16	60-64
5/64	36-48-72
3/32	48-56-60
7/64	48-56-60
1/8	32-40
5/32	32-36-40-48
9/64	36-40-48
11/64	36
3/16	20-24-32
13/64	32-36-40
7/32	24-28-32
1/4	18-24-26-27
	30-32-36-40-48
5/16	16-20-22-27
	28-32-36-40
3/8	12-16-18-20-27-28-32
	36-40-48
7/16	12-16-18-22-24-27-28
	30-32-36-40
1/2	12-14-16-18-22-24-26
	27-28-30-32-36-40
9/16	16-20-24-27-28-30-32-40-48
5/8	12-14-16-20-24-27-28-32
	36-40
11/16	11-16-18-20-24-27-28-30-32
3/4	9-11-12-14-16-20-24-26
	27-28-32
13/16	10-14-18-20-27-32
7/8	10-12-16-18-20-24-27-28-32
15/16	8-9-10-12-14-16-18-20-24-32
1	10-12-16-18-20-24-27-32-40
1-1/16	12-14-16-18-20-24
1-1/8	8-10-14-16-18-20-24-32
1-3/16	8-10-12-14-16-18-20-24
1-1/4	8-10-14-16-18-20-24-32
1-5/16	12-14-16-18-20-24-32
1-3/8	8-10-14-16-18-20-24
1-7/16	8-10-12-16-18-20-24
1-1/2	8-10-14-16-18-20-24-28
1-9/16	18-20-24-36
1-5/8	5 1/2-8-10-12-13-16-18-20-24
1-11/16	16-12-14-16-18-20-24



### SIZE THREAD

1-3/4	8-10-12-14
	16-18-20-24
1-13/16	8-10-12-14
	16-18-20
1-7/8	8-10-12-14
	16-18-20-24
1-15/16	8-10-12-14
	16-18-20-24-28
2	4 1/2-8-10
	12-16-18-20
2-1/16	12-14
2-1/8	12-16-20
2-3/16	12-16

### SIZE THREAD

2-1/4	4 1/2-8-12
	14-16-18
2-5/16	12-18
2-3/8	12-16-18
2-1/2	8-10-12
2-9/16	18
2-5/8	12-16-20
2-3/4	16
2-7/8	8-12-16
3	8-16
3-1/4	8-12-16
3-1/2	8-12-18
3-7/8	6
4	8-12

## HIGH SPEED LEFT HAND TAPS

### SIZE THREAD

0	80
1	56-64-72
2	56-64
3	56
4	32-36-40-48
5	40-44
6	32-36-40
8	32-36-40
10	24-30-32-40
12	24-28-32
1/4	20-28-32
5/16	16-20-24
	28-32
3/8	16-24-32
7/16	14-20-28
1/2	12-13-20-28
9/16	12-18-20-24
5/8	11-12-18
	20-24

### SIZE THREAD

11/16	11-16-24
3/4	10-16-18-20
13/16	16
7/8	9-12-14-18-20
1	8-12-14-16-18-20
1-1/8	7-12
1-1/4	7-12-16-18
1-3/8	6-8-10-12-16-18
	20-24
1-7/16	8-10-12-14-16-18-20
1-1/2	6-8-10-12-16-18-20
1-9/16	8-10-12-16-18-20
1-5/8	8-10-12-14-16-18-20
1-11/16	8-10-12-14-16-18-20
1-3/4	8-10-12-14-16-18-20
1-13/16	8-10-12-14-16-18-20
1-7/8	8-10-12-14-16-18-20
1-15/16	8-10-12-14-16-18-20
2	4 1/2-10-12

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Wheaton, Ill.



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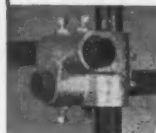
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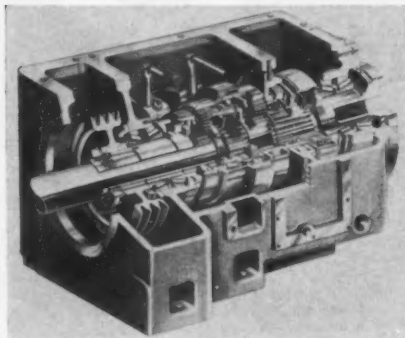
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Lathe has a planetary gear, hydraulically actuated drive. This reduces the



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The cut-away view shows the center gears, planet pinion gears, internal gears, hydraulic cylinders, clutches and brakes. Precision Timken roller bearings at the spindle front and rear permit the machining of heavy parts at high speeds with close tolerances.

Use ACTION Card, opposite page 64. Encircle No. 58

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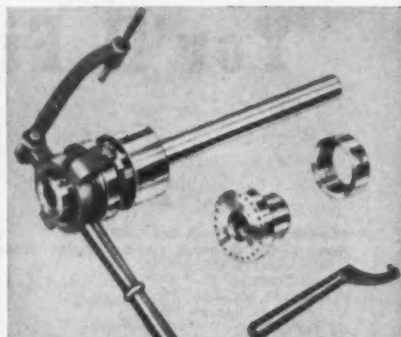
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Quality Tool Works, Dept. B, Waukegan, Ill., has announced a tapered shank keyseat cutter. The company states that the advantage of the taper shank is that the cutter runs concentric, thereby improving the finish and cutter life.

Use ACTION Card, opposite page 64. Encircle No. 71



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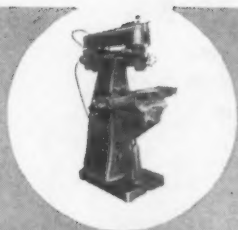
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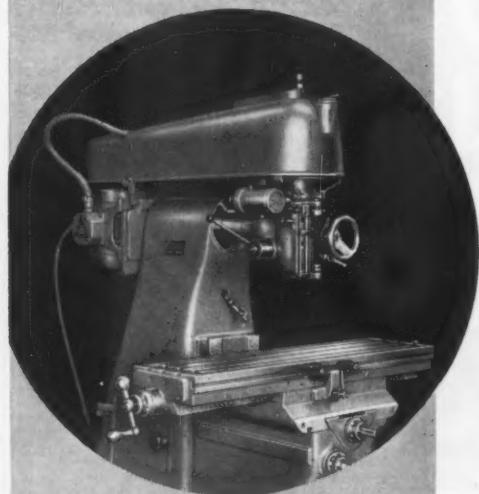
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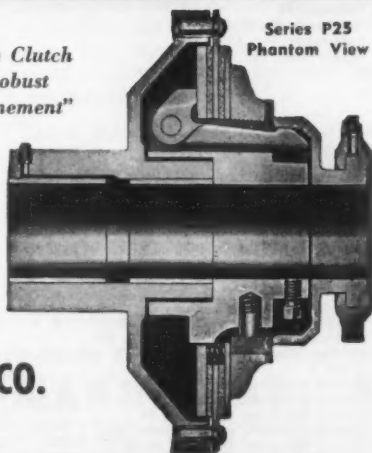
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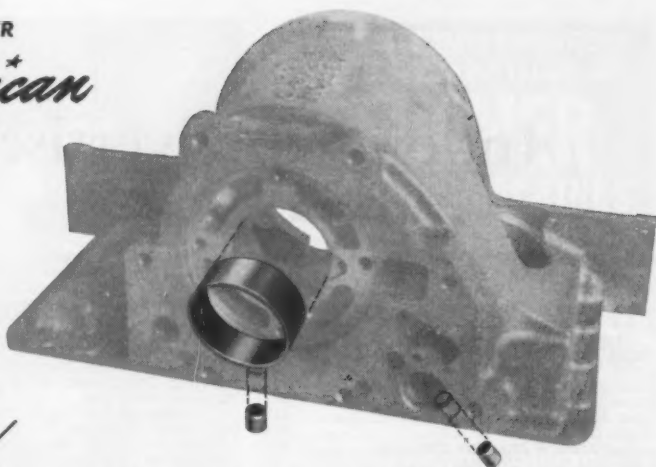
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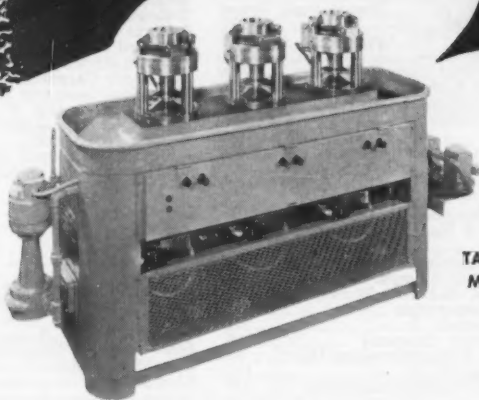
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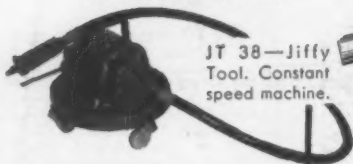
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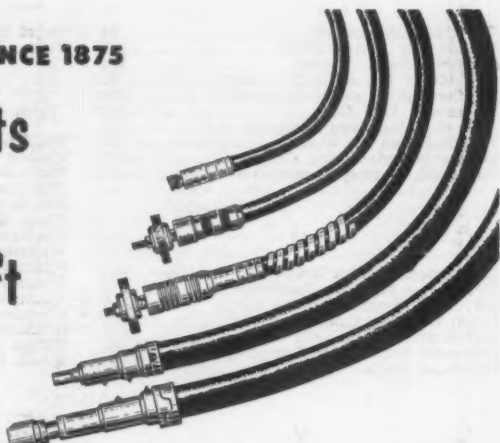


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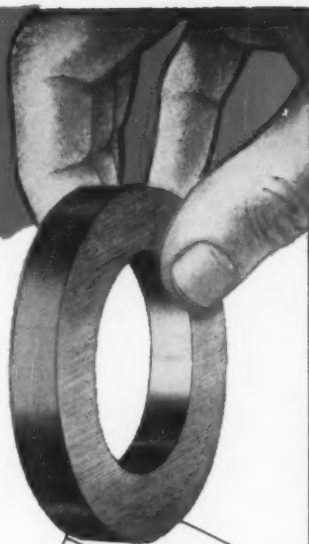


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